The Business Journal of Vegetation Management September 1978/$1.25

WEEDS TREES & TURF

Soil Reconstruction With Shredders

The Costs of Producing Sod in Maryland

Vegetation Management and Proscape

1979 BUYERS GUI

Grounds Crew at Georgia Tech Loads Leaf Compost Into Shr

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At Last! One Grass That is Designed to Cover Your Entire Course... Tees, Fairways, and Greens!

Hole #6 on the 4th nine at Congressional Country Club, Bethseda, Maryland had tees and greens seeded to Penneagle in September of 1977. Penneagle green was opened for play in June of 1978.

When a new grass is developed with the extensive research and testing that has gone into Penneagle Creeping Bentgrass it has these selected attributes of a great golf course grass. We say it's great for the entire course from tee to green. Penneagle is one grass that makes course management easier through mowing schedules, watering schedules and fertilizing schedules.

PENNEAGLE:

1. Has a broad genetic base for greater climatic adaptability.
2. Is not overly aggressive, but competitive with Poa annua.
3. Has tight, more upright growth characteristics.
4. Is finer leafed than most creeping bents.
5. Has excellent putting and playing qualities.
6. Was bred for disease resistance.

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In Limited Quantities

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BENTGRASS

PENNEAGLE

WT&T

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SEPTEMBER 1978/VOL. 17, NO. 9

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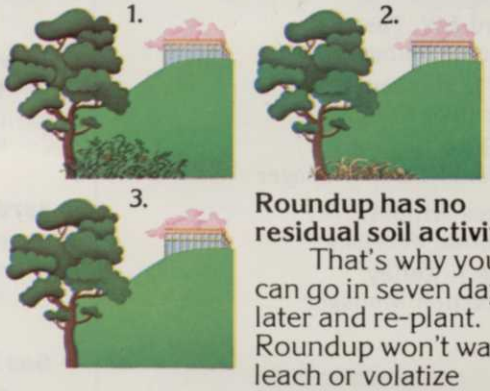
Roundup®. There's no better grooming aid for unruly turf.

Roundup® belongs in your turf renovation program.

Renovation of a weedy fairway, sod farm or other grassy area used to be a laborious and time-consuming chore, but not any more.

Not with Roundup® herbicide by Monsanto. Because one application of Roundup will control many annual and perennial weeds, yet allow you to proceed with tillage and planting operations as soon as seven days later.

Roundup also makes sense wherever treatments for grounds maintenance are called for. One man with Roundup in a backpack sprayer can replace many of the herbicides and frequent repeat treatments that are often necessary.



Roundup has no residual soil activity.

That's why you can go in seven days later and re-plant. Roundup won't wash, leach or volatize from the treated area to injure desirable vegetation. Naturally, normal precautions should be observed to avoid spray drift.

Roundup gets to the root of the problem.

Including many of your toughest vegetation problems, like: bluegrass, bermudagrass, quackgrass, bindweed, johnsongrass, fescue and vaseygrass.

Can you afford to let another season go by without Roundup in your turf renovation and grounds maintenance programs? Your local chemical dealer is the one to see for your supply of Roundup herbicide.

"Translocation" is the key.

Roundup is applied to the weed foliage, absorbed through the leaf surface, and "translocated" throughout the entire plant. In this way, Roundup destroys the entire weed, including the roots or rhizomes.

There's never been a herbicide like this before.

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RI78-04

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VIEWPOINT

Bruce F. Shank, Editor

Most directories are for the advertiser. In this issue we have tried to provide a directory for the reader.

For the first time Weeds Trees & Turf contains a list of both equipment and chemical distributors in the U.S. and Canada. After all, the majority of you buy from dealers and distributors, not manufacturers. After each dealer is a list of brands he carries. So, at least in theory, you can locate the dealer listings for your state, look through for dealers near you and the brands they carry. You may discover that there are more dealers in your area than you previously thought. A little competition between dealers might save you some money.

Too often the role of the distributor in the Green Industry is underplayed. The distributor is the advisor on product use, the person who repairs your equipment, helps you obtain financing for some large purchases, and recommends changes to the manufacturer. A product won't succeed on the market if distributors don't like it.

Our list is a first stab at organizing a list of distributors of all Green Industry products and making it available as one collection to the industry. The list could double in size for next year's Buyer's Guide.

We encourage distributors to contact Weeds Trees & Turf so that we can list them next year. The companies listed in this issue were provided by cooperating manufacturers who realize the distributor is their strength in the field. Distributors who aren't listed may recommend to their manufacturers that a list be provided next year.

Our December issue will profile the distributor. We will strive to show dealer costs, mark-ups, repair problems, customer services, and the situation of being in the middle, between manufacturer and user. If the distributor you buy from is an example of how it should be done, please write to me with his name and background. We must pick three or four out of the thousands in the U.S. and Canada for featuring. We'd like you to pick the best ones for us.

The SPYDER®

THE SPYDER — A material handler that offers unequaled performance, low maintenance and operating costs. Over 300 are currently being used by SOD producers across the U.S.A., Canada and England.

COMPARE this user proven material handler with other methods of job site unloading and the bottom line will show you that THERE IS NO BETTER WAY!!

Ask your friends. If they say they don't like the Spyder, they've probably never tried one.

IT ARRIVES WITH THE LOAD, UNLOADS ITSELF . . . THEN UNLOADS THE LOAD!

For more information on the Spyder, call or write:
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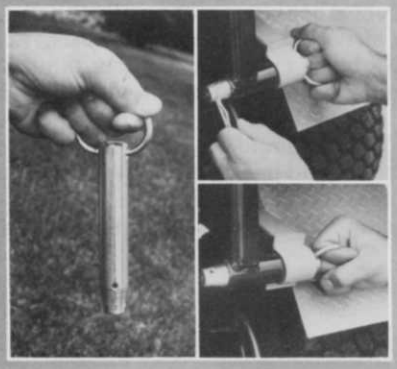
Cushman Turf. Everything

Cushman Turf has developed an easy system to help you save as much as 35% in equipment investment. A system that saves you time with built-in job flexibility. A system that does everything but mow.

The Cushman Turf-Care System includes equipment for aerating, dumping, hauling, top dressing, spiking, fertilizing, spraying, seeding and spreading. The attachments utilize the unique pin-disconnect system.

In addition, all our turf care equipment is designed to be totally compatible with our 3- and 4-wheel pin-disconnect Turf-Trucksters.



PULL PINS. The pull pin advantage of the 18-hp Cushman Turf-Truckster means fast on/off movement of all attachments; it's the secret of the Cushman Turf-Care System's versatility.

1 QUICK AERATOR. The Cushman Quick Aerator is designed to slice greens quickly during the hot, dry periods.

Just attach the Quick Aerator to the Turf-Truckster with three pull pins. The hydraulic system and dump kit on the Turf-Truckster allow you to lift and lower the Quick Aerator on the go from your seat. So movement from green to green is simple and fast.

Three types of tines are available: slicing, coring (two sizes) and open spoon.

2 SHORT DUMP BOX & FLATBED/BOX. The short box or the flatbed/box is capable of hauling up to 1,000 lb. payloads.* A manual hydraulic dumping system is available, and either box is mounted quickly using only two pull pins. 18-hp pin-disconnect Turf-Trucksters can be equipped with powered hydraulic dumping. By adding the PTO and hydraulic packages you can dump hydraulically without leaving your seat with either 18-hp Turf-Truckster. Just push a lever.

*Rating for vehicle equipped with 9.50-8 rear tires.

3 QUICK SPIKER. Attach the Cushman Quick Spiker to a Turf-Truckster equipped with PTO, hydraulic system and dump kit with just three pull pins. Spike a 57-inch swath, even over undulating greens, with the two precise spiking gangs. Nothing to tow. Nothing to load or unload. Spike 18 greens in less than 2½ hours.

4 TRAILING SPIKER. Attach the Cushman Trailing-Type Wheeled Spiker and you'll get the same results as with the Quick Spiker, except the Trailing-Type Spiker is controlled by a pull rope to raise and lower while operating.

but mowing.

5 SPRAYER. The PTO package with extension shaft makes the 18-hp Turf-Truckster ready to spray greens the easy accurate way.

The Turf-Truckster transmission and built-in variable speed governor assure a uniform ground speed, even over varying terrain. And an accurate metered spray means proper application and less chemical waste.

The complete optional spray package includes: 100-gallon capacity tank, high-flow nylon strainer, jet agitator for mixing, high-pressure handgun (which sprays up to 40 feet), rear sprayer boom, centrifugal pumping system for boom or handgun spraying.

6 TOP DRESSER. The chassis-mounted top dresser, driven by the PTO of the Turf-Truckster, eliminates the need for self-powered units and time-consuming walking.

The moving bed and rotating brush operate at a controlled speed to dispense top-dressing materials and direct them downward in a 31½-inch swath. The engine/ground speed governor keeps your spreading rate constant.

7 SPREADER/SEEDER. The Cushman Cyclone Spreader/Seeder can be rear mounted on either the 3- or 4-wheel 18-hp Cushman Turf-Truckster, and it's controlled by the Cushman PTO extension shaft. Depending on the material, this spreader can broadcast over an area up to 40 feet wide.

In addition, the Cyclone Spreader/Seeder mounts on either the short box or flatbed/box and the driver controls all operation from his seat.

8 GREENSAVER (DRUM AERATOR). The Cushman Greensaver™ is the efficient low-cost way to aerate greens and tees. Attach the Greensaver to your Turf-Truckster (equipped with a hydraulic system and dump kit) with 3 quick-release pull pins.

Add weight trays and sand to the Greensaver attachment and you're ready to aerate up to 10 times faster than walk-type units. And the Greensaver collects the cores while you aerate, if desired.

Get a free demonstration of the complete Cushman Turf-Care System from your Cushman dealer. Or, write direct for complete information.

CUSHMAN TURF-CARE EQUIPMENT

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a Division of
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GREEN INDUSTRY NEWS

RECLAMATION

ALCA eyes prospects

About 100 ALCA members attending the group's revegetation and erosion control symposium August 1-3 in Denver were told to look to small coal companies, the Texas Department of Transportation and other government agencies for future revegetation work.

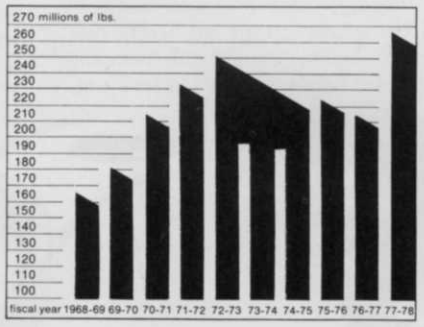
Jim Brown from North American Coal Corp. Bismarck, N.C. office told the contractors that their biggest source of potential business is coal companies without reclamation staffs. "They may set up consortiums to get the work done more cheaply. But they must have it to survive," Brown said.

Texas will continue its road programs in the next few years, and Paul Northcut from the Department of Transportation promised work for contractors during that time. "Most of the highway districts are understaffed, so the percentage of landscape contracting will increase substantially in the next few years. I suspect it will increase 100 percent at least in the next five years," Northcut said.

Jim Lincoln, of Southwest Hydro-Mulchers Distributing Co. in Dallas, Texas, also reminded members to look for work at various government agencies.

He suggested the U.S. Forest Service, the Army Corps of Engineers, U.S. Soil Conservation Service, local flood control districts and river and port authoritys.

The show was capped by an exhibit in the Marriott Hotel and a field trip to revegetated areas in the Rocky Mountains.



Ryegrass seed hit record levels for the 1977-78 fiscal year according to the Oregon Ryegrass Commission. The record crop for both annual and perennial ryegrass was due in part to increased demand for ryegrass seed brought about by introduction of new ryegrass cultivars. The record of 268 million lbs. upsets the previous 1972-73 record of 251 million lbs.

PESTICIDES

Experimental sprayer avoids handling risks

A system to eliminate dangerous pesticide handling is being developed by agricultural engineer Donald L. Reichard and technicians D. L. Collins and P. T. Keck, stationed at the Ohio Agricultural Research and Development Center (OARDC).

"On our sprayer, all liquid flows are controlled from the control panel by the operator," Reichard says. "Metering pumps draw the chemicals from their containers, at rates proportional to travel speed, and mix them with water in a small mixing chamber on the way to the sprayer nozzles."

As well as eliminating the pouring operations, the system also does away with disposal of left-over tank mixtures. And the operator can flush the containers from the control panel, Reichard adds.

The sprayer development is only part of the scientists' overall federal research effort to improve the efficiency and safety of chemical pesticide application equipment.

NURSERY

IRS offers chance to switch accounting

A recently issued policy by the Internal Revenue Service provides nurserymen with one chance to switch from accrual to cash accounting to solve a problem with inventory taxes.

Previously, the nurserymen had been grouped with farmers in a ruling which requires farmers doing less than $1 million per year to use accrual accounting for crop inventory.

The opportunity to switch to cash accounting is a one-time offer which must be filed for the first taxable year beginning on or after Jan. 1, 1978.

RECLAMATION

Prairie hay mulches also provide seed

Prairie hay is showing promise as a mulch for revegetation of strip mined lands, according to range scientist Ronald E. Ries. The hay could be a feasible alternative now that Public Law 9587, passed in 1977, requires mulching as part of the reclamation effort.

Dr. Ries, stationed at USDA's Northern Great Plains Research Center in Mandan, ND, harvested prairie hay at five monthly intervals, beginning June 1, and applied the hay as a mulch to seed flats in the greenhouse at a rate equal to 3000 pounds per acre. The flats contained topsoil similar to that normally returned to strip mined areas.

Hay harvested October 1 contained the most viable seed, Ries said, and the most common seedling was the native perennial broadleaf herb, cutleaf goldenweed.

Ries is expanding the project to

The shot heard 'round the Turf world:

Yorktown II

Turf-Type Perennial Ryegrass

SO GOOD IT'S REVOLUTIONARY!

Revolutionary because: Yorktown II rated the best in summer performance (heat tolerance) in tests conducted at Rutgers University under the direction of Dr. R. Funk. . .yet rated number one in fall and winter performance as well. The "all-year long" ryegrass.

Revolutionary because: Yorktown II rated number one in turf quality in tests conducted at the Beltsville Agricultural Research Center under the direction of Jack Murray.

Revolutionary because: Yorktown II ". . .was the only variety to produce acceptable turfgrass quality without the use of fungicides" based on a 1-year trial at Beltsville, Md. More disease resistant.

Revolutionary because: Yorktown II proved number one in overall turf quality. . .including appearance, density, mowing quality and disease resistance in two separate testings conducted at Rutgers University against 33 and 39 other ryegrass varieties.

Add to these new test results the qualities you've come to expect from using Yorktown. . .good color, fast germination, great seedling vigor, neat mowability and a great compatability with varieties like Jamestown fescue for use in southern overseeding programs. No wonder YORKTOWN II is so good. . .

It's Revolutionary

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Landscape Contractor News

Subcontractor is liable for site safety

If a subcontractor does not protest safety violations to the contractor, he can be held responsible for those violations by the Occupational Safety and Health Administration, according to a recent ruling by OSHA's Review Commission. The Association of Landscape Contractors recommends that subcontracting landscape contractors complain in writing to the contractor whether or not the safety violations are serious ones.

ALCA to establish student chapters

Student organizations at accredited two- and four-year colleges with a curriculum in landscape contracting or related horticultural field may affiliate with ALCA according to a recent ruling by the ALCA Board of Directors. The group must have an advisor who is an affiliate member of ALCA and contain four or more students. Dues will be set by the Board of Directors.

Southern California turf expo approaches

One of the largest turfgrass and landscape shows in the Southwest is coming up Oct. 18, the Southern California Turfgrass/Landscape Equipment and Materials Educational Exposition in Costa Mesa, California. More than 4,000 landscape contractors, golf course superintendents, nurserymen, and other grounds managers are expected each day at the two-day show.

The exposition was started in 1960 to combine numerous industry events into one centralized show with exhibits and educational sessions. Interested persons should contact the Southern California Turfgrass Council at 213-798-1715.

Conwed opens new fiber mulch plant

Hickory, North Carolina will be the site of a new wood fiber mulch plant to produce Conwed Hydro Mulch products used in hydraulic mulching for turf establishment. Construction is scheduled to begin in mid-1978 with production beginning in early 1979.

Demand for Conwed's Hydro Mulch product has reached the point where production at the Cloquet, MN facility is nearing capacity, according to F. T. Weyerhaeuser, president. The North Carolina site was selected to meet the increasing demand and to better serve the growing market in the eastern United States.

Mississippi degree attracts out-of-staters

Nearly a third of the students in the Mississippi State University Landscape Contracting Program are from out of state says program advisor Robert A. Callaway. A fourth come from outside the South he adds.

MSU offers a four-year program which includes on-the-job time, agricultural mechanics, botany, land surveying, soils, basic drawing, design, architectural graphics, plant materials, accounting, business law, landscape construction, and finance.

Callaway says the demand for graduates exceeds the supply. The contracting program is a part of the landscape architecture department at MSU. Persons interested in the program should contact Calloway at P.O. Drawer MQ, Mississippi State, MS 39762.

field plots in them to collect more information. He hopes to more accurately predict the number of viable seeds and the plant species mixtures of the prairie hay mulch in relation to harvest times, weather conditions and the range sites.

AQUATIC WEEDS

"Natural" herbicide may be possible

Government and university scientists are going to study the toxic compounds released by spikerush, an equatic weed sometimes used to control larger, more troublesome weeds growing in irrigation canals. If the joint project of the University of California, Davis, and the USDA is successful, development of a "natural" aquatic herbicide may be possible.

Scientists will try to isolate, identify, and synthesize the toxic compounds produced by spikerush, under a one-year $35,000 cooperative agreement.

The project is under the directon of Floyd M. Ashton, plant physiologist at U.C., Davis. Peter A. Frank, Science and Education Administration plant physiologist, will coordinate the studies for the USDA.

HORTICULTURE

Solar energy, rocks to heat greenhouses

Scientists at the North Carolina Agricultural Experiment Station, under a cooperative agreement with the USDA, will develop a rock-bed heat storage system they hope will eventually supply as much as 50 percent of the heat needs of greenhouses.

The rock-bed will store excess heat from the sun-heated greenhouse that will then be available for use at night or during cloudy weather to maintain a desirable temperature for plants in the greenhouse.

The one-year $32,455 project is being funded by the Department of Energy, administered by USDA's Science and Education Administration, and is part of government efforts to conserve fossil fuels by finding ways to use solar energy. D. H. Willits will be the principal investigator.

Jack Lynn, licensed landscape architect. Owner, Landscape Designers, Franklin, Tenn., consultants to Vanderbilt University.

"Jobe's Spikes are a good opportunity to make money in the winter."

Jobe's Tree and Shrub Spikes help Jack Lynn make money in the off-season. They extend his business well into winter, when crews would otherwise be idle. Lynn adds, "Jobe's Spikes take the guesswork out of feeding trees and shrubs. We wouldn't use anything else."

Jobe's Spikes build profits from the ground up.

Join the tree care professionals who make more money by using Jobe's® Tree and Shrub Spikes.

In every type of climate . . . every kind of soil from sand to heavy clay, Jobe's Spikes have proved their effectiveness. They're better than broadcast fertilizer because plant food gets down to the roots without danger of run-off, burned turf or excessive leaching. And you know exactly how much fertilizer you've applied. A plastic cap makes driving easier and protects the spikes while they're being driven.

Jobe's Spikes require no expensive equipment or skilled labor. Just tap into the ground around the drip line at the rate of one spike per inch of trunk diameter.

Rainwater or soil moisture does the rest. *Jobe's® Tree and Shrub Spikes feed trees in about one fourth the time, at less than half the cost of drilling.* A 5" diameter tree takes about 5 minutes labor. Compare that to 30 minutes to drill holes, plus time and cost to apply 10 pounds of fertilizer.

Jobe's Spikes are a pre-measured amount of fertilizer formed into easy-to-drive spikes by means of a patented binder. The binder provides uniform release of nutrients. Tree and Shrub Spikes are 16-8-8 analysis. Evergreen Spikes are 12-6-8. Fruit Tree Spikes are 5-15-15.

Call your local Jobe's distributor or order direct. $30 per case (105 Spikes) prepaid, 5 case minimum. 15 or more cases, $25 per case. 36 or more cases, $22.50 per case.

Jobe's®
TREE & SHRUB SPIKES

The easy method for professional tree care.
International Spike, Inc., P.O. Box 24207, Lexington, Kentucky 40524. Tel. 800/354-9360. In Kentucky 606/252-1721.

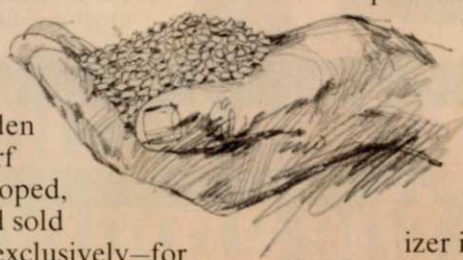
ProTurf PreSeason Sale!
Contact your Tech Rep!

All fertilizers are not created equal.

Scotts ProTurf® High Density Fairway Fertilizer is unlike any other fertilizer you can buy. The name itself tells you the kind of beautiful, vigorous results a professional turf manager like you can expect.

Scotts . . . the grass people. We have more than a century of experience in making things grow.

ProTurf . . . Scotts' professional turf division. It means that this is no garden store variety of turf product. It's developed, manufactured and sold specifically—and exclusively—for schools, colleges, golf courses, landscape contractors, lawn service companies, cemeteries, parks, sod growers and other professional users.



High Density . . . a combination of both fast-acting and controlled release forms of nitrogen in each granule. And unlike conventional mechanically mixed fertilizers, each individual granule is the same analysis that's printed on the bag. It's a completely homogeneous fertilizer, so the nitrogen, phosphorus and potassium are distributed evenly. This means the grass plants get the nutrients in the same proportions you selected. It spreads quickly and easily. And is safer for your turf than many commercial fertilizers. When compared to a 12-4-8 fertilizer, it saves you two-thirds of the storage space and reduces labor by as much as fifty percent because you apply fewer bags per acre.

Fairway Fertilizer . . . originally developed to meet the needs of golf course superintendents for a high quality, high nutrient, non-burning, long lasting maintenance fertilizer. ProTurf High Density Fairway Fertilizer is now applied by thousands of turf managers in the United States and Canada in all sorts of use and environmental conditions.

But find out for yourself. Try Scotts ProTurf High Density Fairway Fertilizer on your turfgrass this season. The proof will be in the results.

All ProTurf products are sold directly to professional users. For more information about High Density Fairway Fertilizer or our fifty other fertilizers, fungicides, insecticides, herbicides, combination fertilizer/pesticides, seed and equipment, contact your ProTurf Technical Representative or **call ProTurf collect at 513/644-0011.**

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IRRIGATION

Texas A&M, Toro to study water use

A contribution to Texas A & M University by the Toro Comany will help finance a four-year study of water use rates for turf-grasses. The work will be directed by Dr. James Beard and was conceived by graduate student Don Johns.

The purpose of the study is to improve water irrigation efficiency and to help identify water requirements of certain turfgrass cultivars.

TREE

Arborists report growth in volume

Despite bad spring weather, arborists are reporting growth in business volume this year. A survey conducted by the National Arborist Association revealed that more than 75 percent of arborists are experiencing increased volume in tree spraying, trimming and general tree care.

However, arborists indicated a reduction or no increase in landscaping work. Only Midwest arborists said they experienced an increase in landscaping work for the first half of 1978.

The arborists expect the remainder of the year to produce excellent sales.

TREES

Funds appropriated for chestnut blight

Funding proposed by Sen. Robert Byrd (D) of West Virginia has been appropriated for research on a possible solution to chestnut blight at the Northeast Forest Experiment Station in Morgantown, W.Va.

The research to be performed by West Virginia University and Virginia Polytechnic Institute researchers centers around a strain of the chestnut blight and a phenomenon called hypovirulence. Strains of the disease can actually heal chestnut blight cankers. The object is to isolate this strain and produce it for use against the blight.

GOVERNMENT UPDATE

Options sought for disposal regulations

Triple rinsing as a label requirement is one option to proposed pesticide container disposal regulations termed not enforceable by EPA's Office of General Counsel.

The lawyers said FIFRA is a labeling act and enforcement is legal only in cases of label violations. Current proposed regulations do not involve specific labeling instructions and therefore would be not enforceable nor would they mean criminal penalty. Pesticide suppliers may be asked to implement recycling programs under options being considered by EPA.

Conference Committee agrees on state primacy

The House-Senate Conference Committee reviewing FIFRA amendments agreed that states with approved plans will be the primary enforcers of FIFRA. The committee also defined pest control operators as commercial applicators and not distributors subject to warrantless inspection and stiffer penalties.

Thirty states have approved pesticide use plans and therefore will come under the primacy rule if the amendments are approved by the House and Senate and signed by the President. States without approved plans will be subject to Federal enforcement. A condition permits Federal intervention in the case of emergencies.

Inconsistent use exceptions settled

The House-Senate Conference Committee has reached an agreement on proposed FIFRA legislation regarding use inconsistent with the label. If passed by House and Senate and signed by the President, the exceptions will be:

—using a pesticide at less than label concentration
—mixing pesticides with fertilizer if not specifically prohibited by the label
—applying a pesticide for a target pest not listed on the label providing the application is to a labelled crop, animal or site and the label does not specifically prohibit use against that target pest
—using a method of application not listed on the label.

Cloture fails again, labor bill delayed

The controversial, pro-union Labor Reform Bill will not be passed this year because an effective filibuster and failure to invoke cloture have made a final vote impossible.

OSHA permits access to safety records

Rules have been revised by OSHA permitting worker access to the employer's log of job-related injuries and illnesses. All employers with 11 or more employees must maintain such records under law.

PEOPLE

Dr. Fred V. Grau has been awarded life membership in the Pennsylvania Roadside Council in recognition of his outstanding contribution to improving the scenic beauty of that state.

Dr. Grau, agronomist, turf authority, and president of Grasslyn, Inc., College Park, MD, discovered crownvetch by "taking the right forks in the road" while taking a leisurely, scenic route to a meeting.

In 1970, it was estimated that more than 18,000 acres of Crownvetch had been planted along Pennsylvania rights-of-way since 1947, resulting in a savings to taxpayers of more than $100,000 in mowing costs alone.

Ray McMicken, president of the B. Hayman Co., Santa Fe Springs, CA, has accepted a position on the Board of Directors of the Musser International Turfgrass Foundation, according to Dr. Fred V. Grau, president of MITF. McMicken fills the vacancy created by the resignation of Wayne Morgan, Kellogg Supply, Inc., Carson, CA.

McMicken has won the Top Volume award for his company four times, putting him at the top of all U.S. Jacobsen distributors. He has been active in many turf-oriented projects in Southern California and in Hawaii. Assistance to young turf students is a favorite endeavor.

"We are fortunate in having a man of Ray's caliber join us in our efforts to develope trained leaders for the future," said Dr. Grau.

David McLaughlin, chairman and chief executive office, The Toro Company, Minneapolis, has been elected to the Board of Directors of the Chamber of Commerce of the United States. His election to the 65-member policy setting group of the world's largest business federation was announced by Chamber President Richard L. Lesher.

McLaughlin joined the Toro Company in 1970 as president, assuming the additional role of chief executive officer three years later. Last year he was named chairman of the board.

McLaughlin is also chairman of the board of trustees of Dartmouth College and a board member of Dunwoody Institute; the Minneapolis Society of Fine Arts; National Alliance of Businessmen, and the Better Business Bureau. He serves as a member of the board of advisors of the Midwest Research Institute and on the Stanford Research Institute Council.

Drummond L. Kurtz has been named Vice President of Operations for E-Z-Go Textron. The promotion, effective immediately, was announced this week at Polaris E-Z-Go Textron's division headquarters in Minneapolis. In his new position, he has responsibility for all manufacturing operations at the division's golf car facility in Augusta, GA.

Since joining E-Z-Go in 1974, Kurtz has acted as production control manager and manager of materials. Previously, he served in marketing and in similar production capacities at Vecta Educational Co., Kalamazoo, MI.

Dr. Sven-Ove Dahlsson, of Landskrona, Sweden, visited the turfgrass research project in the Department of Soil & Crop Sciences at Texas A&M University for a two-week period in June, 1978. Dr. Dahlsson is with the W. Weibull A. B. Seed Company and Weibullsholm Plant Breeding Institute where he is active in turfgrass research and education work.

The Southern Nurserymen's Association honored three individuals at their annual meeting during August in Atlanta, GA. **Fred C. Galle,** Director of Horticulture of Callaway Gardens, GA, was presented the "Porter Henegar Award for Horticultural Research". The award is given annually to the individual who, in the opinion of his fellow horticulturists, has made outstanding contributions to the nursery industry through research and has participated regularly in the association's Research Conference.

Louis Hillenmeyer, Jr., Hillenmeyer Nurseries, was honored with the Slater Wight Memorial Award, the SNA's highest award for service. The award was presented to Hillenmeyer in recognition of his active participation in association activities and his contributions to the success of the nursery industry in the southern region. He currently serves on the public relations advisory committee.

John C. Watkins, design consultant and advertising manage of Watkins Nurseries, was honored as the 1978 recipient of the David El Laird, Sr. Memorial Award. This award is given annually in memory of Richmond David E. Laird, Sr., to recognize the young member who has made outstanding contributions to his state and regional associations.

Other association business during the annual meeting included election of new President **William J. Park,** president of Geo. W. Park Seed Co., Greenwood, SC. Park is the 74th president of the association.

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UNIVERSITIES USE SHREDDERS FOR RENOVATION AND COMPOSTING

Grounds maintenance at a university, particularly a large state university, requires mechanization — a considerable number of vehicles and other equipment. Tractors, loaders, mowers, spreaders, dozers, sprayers, scrapers, chippers. You wouldn't think, however, that a university would have use for a high capacity soil shredder. But several large universities have found ways to keep shredders busy and cut maintenance costs at the same time.

Two such schools are Penn State University and Georgia Institute of Technology, better known as Georgia Tech. Both are using shredders to reduce labor costs and improve the quality of grounds maintenance. Penn State has two shredders. One is used by the Joseph Valentine Turfgrass Research Center to prepare soil mixes for turfgrass experiments. The other shredder is used by the university's Landscape Operations department for a variety of construction and maintenance projects requiring clean, homogeneous soil mixes. Georgia Tech's principal use for its shredder is to convert composted leaves into "free" humus that's used for various purposes on campus grounds.

Penn State Turf Research Center

There were few turfgrass schools in the nation in 1928 when Joseph Valentine, superintendent at Merion Golf Club in suburban Philadelphia, traveled to Penn State to ask for the same kind of support and help for turfgrass problems that farm research was getting from the school. He apparently was a good salesman because a turfgrass program was started the following year. Through Joseph Valentine's continuing efforts, the school was supported through the difficult years of the Depression by state appropriations for turf research.

After turf experiments are completed, the top six inches of soil are removed, reconditioned and then replaced. During reconditioning the soil is shredded and screened.

In 1932, the school started the academic phase of turfgrass management by accepting the first students. Then, in 1967, Penn State officially named the turfgrass facilities the Joseph Valentine Turfgrass Research Center. Today, Penn State's Turfgrass Center in University Park is part of the Department of Agronomy and provides teaching and research programs on turf breeding, management, physiology, fertilization, soil physics, and weed control. Disease studies are done in cooperation with the Department of Plant Pathology.

Dr. Joseph Duich has headed the program at the Valentine Center since 1959. "A good proportion of students in our turf program are here because they want to be golf course superintendents," Duich says. "We try to teach them the basics they need to know to do that job well. Our studies dwell on the different types of grasses, soil chemistry, and soil physics, particularly from the point of modifying soils to achieve certain ends. We also stress disease and insect control."

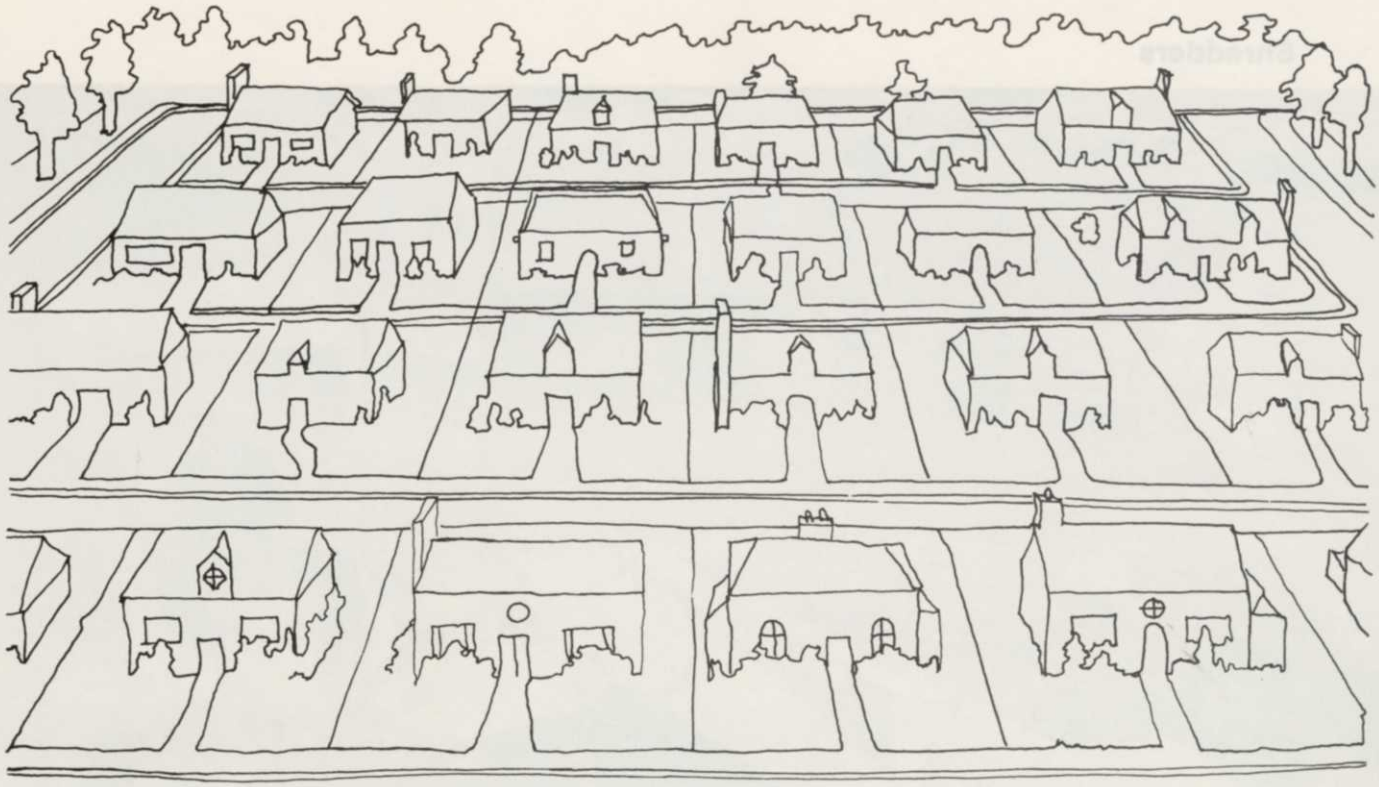
At this time, the Valentine Turfgrass Center has approximately 110,000 square feet of close cut turfgrass devoted to its experimental bentgrass research program. Most of it is cut to putting green height because a large part of the school's current program involves putting greens research. Because the turfgrass research area isn't that large, its use must be managed wisely. After an experiment is completed, the area must be reconditioned quickly to make it suitable for the next round of experiments.

Reconditioning is necessary because of the nature of the experimental work. Fertilizer experiments, for example, might run continuously for four or five years. After the research, the area is checkered with hundreds of 6 by 16 ft. plots, all with different fertilizer and pH levels. To put the plots back into condition for more research, the entire area has to be dug up and all of the soil shredded and aerated.

The Valentine Center attacks this reconditioning by first rotovating the entire area to a depth of approximately six inches. Then loaders push the loosened soil into large piles. Next, the loaders dump the soil into a shredder for processing — shredding, mixing, separating non-shreddable material, and aerating. Because superfine soil mixes are needed for the reconditioning, the processed soil goes directly from the shredder into a powered screen. What the Turf Center ends up with is a homogenous soil mix from which nearly all stones have been removed. This results in an ideal base for turf research.

"We recently reconditioned about half our bentgrass research area," says Duich. "The soil

Continues on page 18



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Georgia Tech grounds crew takes leaves from oldest part of the compost pile for shredding and use on campus.

from a 50,000 square foot plot containing 243 different mixtures was shredded, aerated and screened so that it was all uniform to a depth of 12 inches. We wanted the soil to be as similar as possible to the modified soils found on most golf tees and greens. Because the shredder made the work so easy, we were even able to process a large supply of the same soil and set it aside in a protected bin for topdressing the turf later in the experiment. The research requires that the topdressing be exactly the same as the soil base."

Because so many new homes are built on plots from which all topsoil has been removed, Penn State is also getting involved in research on growing turf on subsoil. Many new homeowners try to establish high fertility grasses on such soils and the grasses don't do well. For that reason, the school is continually involved in research to develop low-maintenance grasses that can tolerate less than ideal conditions. In these homeowner turf programs, soil reconditioning follows the same soil processing procedures used for other plots in order to have uniform soil for research.

Penn State's turfgrass research programs have already paid off with the development of Pennlawn, Pennfine and Penncross grasses, soil modification procedures, and various management aids.

Shredding, mixing, cleaning, and aerating soil without harming its mechanical properties is vital to turf research. "We prefer a belt-type shredder to a hammermill because it does not pulverize the soil," Duich says. "If the soil is dry, a hammermill can destroy the mechanical properties by turning it to dust. By the same token, we purchase fibrous peat to mix with topsoil to construct new plots. We use fibrous peat precisely because it is so structured. If we try to mix fibrous peat and topsoil with a hammermill, it would pulverize the peat and reduce its effectiveness."

Methods to produce modified soil mixes for construction or renovation of golf tees and greens are stressed in the turfgrass program's curriculum. "No longer do we spread topsoil over a green and plant grass," says Duich. "We teach our students to analyze their situation and then mix the proper soil to suit the particular conditions. They can see how easily we do this work here on campus with a soil shredder, and I'm sure they will make use of shredders when they are called on to renovate areas under their responsibility."

Campus Maintenance

The main campus of Penn State is situated on a 4936-acre tract of land in the geographic center of Pennsylvania. Approximately 540 intensely landscaped acres of this tract make up the central campus. Streets, athletic fields and landscaped areas are maintained by the University's Landscape Operations. Penn State's Landscape Operations uses a shredder for a wide variety of jobs. According to Dave Rice, who heads up Landscape Operations, "The shredder is in operation approximately 50 to 60 days per year."

On a campus as large as Penn State's, there is usually a building under construction or a utility ditch being dug. Normally, whenever a trench is opened, the soil is stored off-site while the work is in progress. Once the work is completed, a final layer of shredded and cleaned topsoil is spread over the dug up area. This saves the time-consuming labor required to rake out stones prior to replanting grass.

Landscape Operations also uses the shredder to convert composted leaves to a beneficial leafmold humus for its flower beds and for mixing 2/1/1 with topsoil and sand for topdressing. Leaves are usually stored for approximately 3 to 5 years and then shredded.

Clay and sand for topdressing baseball fields are also processed by the shredder. The sand often has large rocks in it that must be removed and the shredder both cleans and mixes the dressing to the correct consistency.

The school's greenhouses and mushroom growing operations often call on Landscape Operations to provide clean soil mixes for their needs. This replaces a time-consuming hand screening operation used previously to get suitable growing media.

"The shredder has spoiled many of our people," says Rice. "Since they have experienced working with shredded and mixed soils, they don't want to put up with the stones and lumps in unprocessed soils. When they have a certain job to do, like reseeding a turf area, they want the soil processed so that all that has to be done is to put the soil down and level it."

Maintenance on the school's athletic fields keeps the shredder busy cleaning soil. Hundreds of tons of topsoil are processed each year just for this purpose. By not purchasing processed topsoil, Landscape Operations saves the University an estimated $35/cubic yard.

Georgia Tech

David K. Walker, Jr., is the staff horticulturist at Georgia Tech. Through his efforts, recycling programs have been started that aid the City of Atlanta and also benefit the school by reducing reliance on purchased mulches and soil amendments.

Walker believes that grounds maintenance people have to switch their thinking about some things. "We've got resources around us, like leaves and tree trimmings, but it's up to us to turn them into something useful, says Walker. "I've based my leaf and wood chip recycling programs on putting to good use what we used to pay to get rid of."

"Up to now," Walker says, "the easiest answer to a trash situation was to say, 'Let's throw it away.' That was the cheapest way to dispose of it. Then we began to realize that grass clippings, leaves and wood chips have nutrients and other qualities that can be beneficial to our grounds maintenance operations. It began to dawn on us that we were disposing of certain materials and then turning around and purchasing materials that were similar."

Georgia Tech's downtown Atlanta campus occupies 350 acres, or about 10 square blocks. Fine residential properties and businesses surround the school and keeping the grounds attractive is an important job.

Atlanta has a wealth of trees, with oaks and elms predominant. The annual leaf fall used to be trucked by city crews to landfill sites 10 or 20 miles from their pickup points. That was until Georgia Tech's Walker contacted city officials and told them he'd be happy to provide a free, close-by dumping place for a large portion of Atlanta's leaves.

Walker had recognized the value of leaf compost to the school's grounds maintenance operation and knew that he needed more leaves than accumulated on campus each year. With buildings and parking lots occupying a large proportion of the school's property, Georgia Tech's own leaf collection operation is not a big one. The school's vacuum sweeper and street sweeper collect about 300 cubic yards each fall. The city, however, more than makes up for the school's lack of leaves. Each fall city crews deliver about 1500 cubic yards of compacted leaves to the school's leaf composting area.

Georgia Tech's present leaf composting area occupies a 1¾-acre lot that someday will serve as a building site. It is well drained so that stagnant water never causes undesirable odors or mosquito problems.

"We employ a lazy man's approach to composting," says Walker. "Unlike some composting operations which windrow leaves and turn them regularly to speed decomposition, we turn the leaves only once. We do it about a month to six weeks after they are delivered. At that time, our people use a front-end loader or a bulldozer to lift and tumble the leaves and mix in a little of our good red Georgia clay. The leaves are left in a big pile until we need them. If the leaves sit there two years before we get around to shredding them, there's no problem. We simply work off the oldest part of the pile where the leaves are the most decomposed."

"We had to go through a learning cycle with our leaf composting program," says Walker. "We knew we had to shred the compost to get it to a particle size suitable for mulch, for mixing with top soil for lawn renovation, and for potting plants in our greenhouse operation. We tried to find the smallest and cheapest unit that could do the job. However, the 5 hp shredder we bought didn't have the capacity we needed. We now have a 18 hp shredder that handles up to 25 cubic yards per hour. Running it for a full work day gives us 200 cubic yards of material, a worthwhile amount to work with."

Georgia Tech's shredding crew consists of three men. One operates the front-end loader which feeds the composted leaves into the shredder's hopper. Another is positioned on the operating bridge of the shredder to watch over the operation of the machine and to keep the material falling freely onto the belt. The third man works on the

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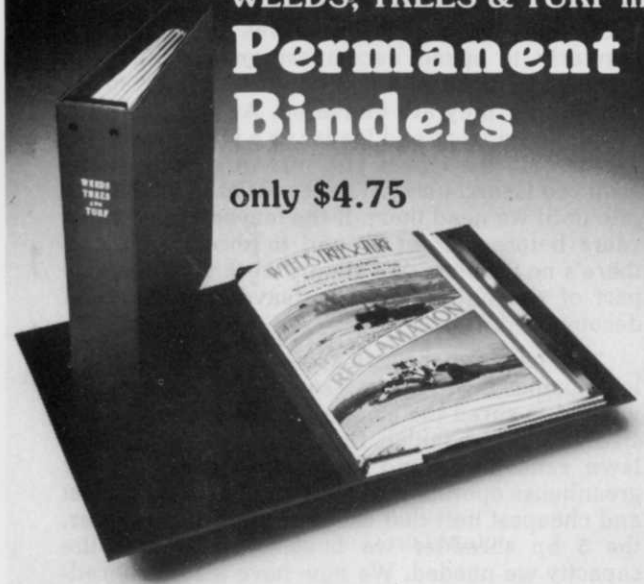

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Shredders

ground and tries to keep large debris such as tree limbs and construction materials out of the way. The shredder processes the composted leaves and discharges the finished product directly into a dump truck. Since the composting area does not permit on-site storage of equipment, the crew tows the shredder back to the garage after they are finished for the day.

"You have to consider the economics of what we're doing," says Walker. "We get the leaves free. We save both the school and the city money because there are no hauling and dumping fees charged. We also save on labor, fuel, and wear and tear on our trucks since they don't have to travel to dumps.

"We shred the leaves when we need them, mostly during the late spring and summer months. I estimate we have a stockpile of about 2,000 cubic yards of compost on site. At the going rate of $7 per cubic yard for equivalent material, we own $14,000 worth of material. These numbers are very attractive to our operation. So far, we haven't has to buy any topsoil since we began our composting program. Previously, we purchased up to 4000 bales per year of pinestraw and other materials."

For mulching around shrubbery and flower beds, Georgia Tech's grounds crew applies a four-to-six-inch layer of wood chips and the leaves which drop to the ground each year are allowed to remain in place as extra compost. The chips are acquired in the same way the leaves are. The school has provided an all-weather free dumping area for local landscapers and tree surgeons to dump their chips. Almost 30,000 cubic yards of chips have been given to the school since 1971.

As part of a current research project, Walker is dumping leaves directly on a wide highway median strip to study how this affects renaturalization. He hopes the study will yield results on new ways to stabilize soil in problem areas. Other benefits anticipated are: reduced labor costs for maintenance; elimination of leaf blowing by passing traffic; increased moisture retention for shrubbery and trees, and regeneration of a natural flora from seeds brought in with the dumped leaves. The leaves are spread to a variable thickness ranging from 6 to 12 inches and are allowed to settle by natural means (wind shift and rain). Some portions of the median have been covered with a two-to-three-inch layer of wood chips to minimize the chance of fire during hot, dry weather.

A recent project called for shredding of 300 cubic yards of compost to be incorporated into the soil for a new four-acre athletic field. The availability of shredded compost eliminated the need to buy peat moss. Walker etimates that nearly one-quarter of the shredder's cost was amortized by this single project.

The success fo Walker's composting program has been recognized by the Georgia Chapter of the American Soil Conservation Society, which recently gave the school its Merit Award. If imitation is the sincerest form of flattery, then the city of Atlanta thinks the program is a good one, too. The city has begun its own composting operation and is using the finished material in its parks. **WTT**

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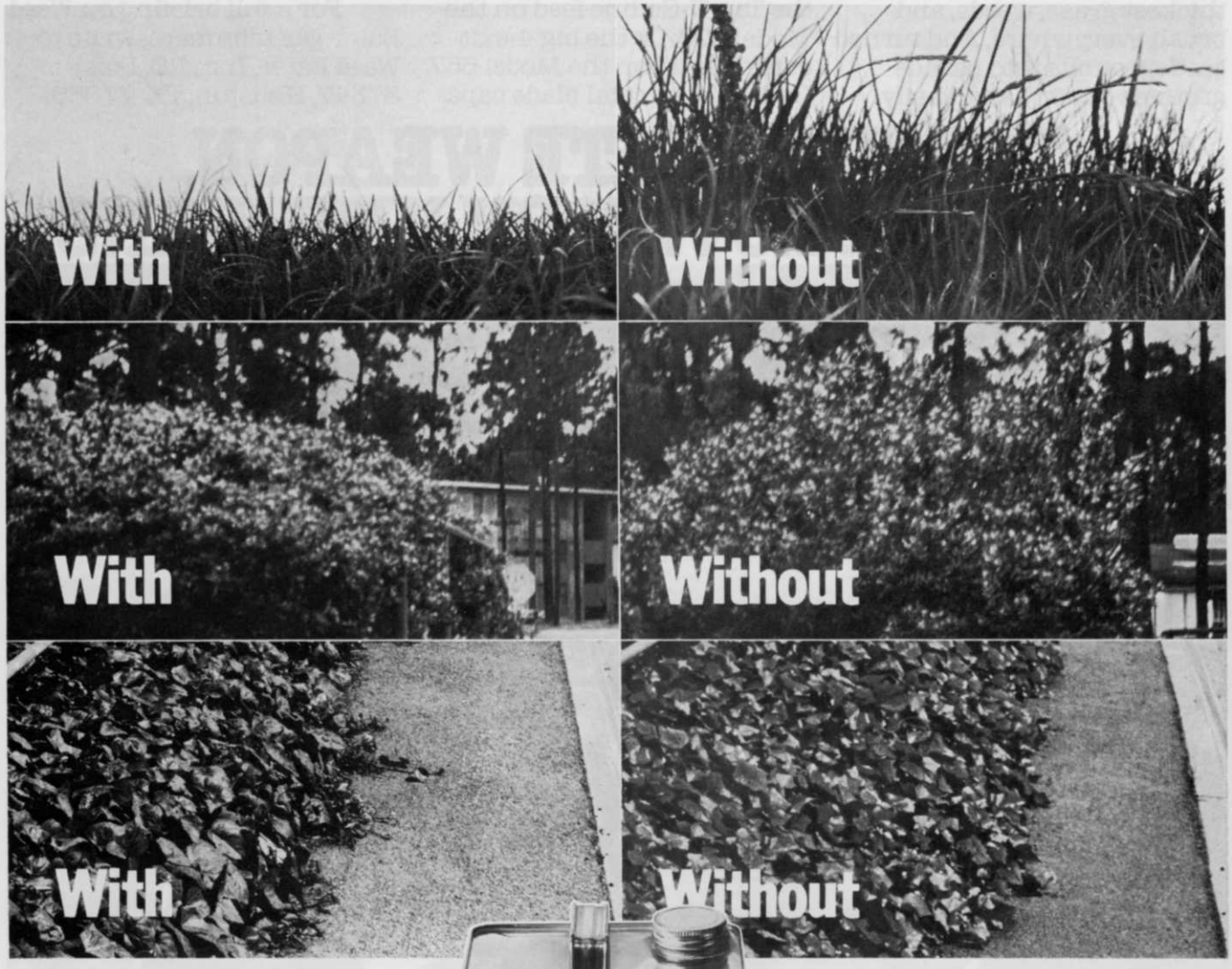

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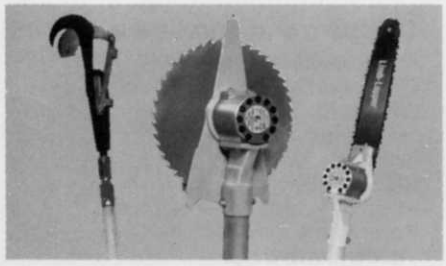

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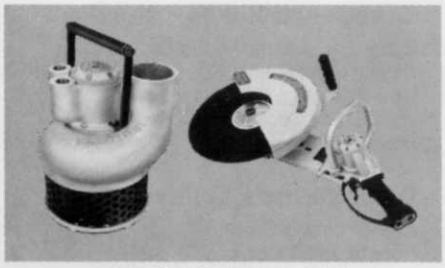

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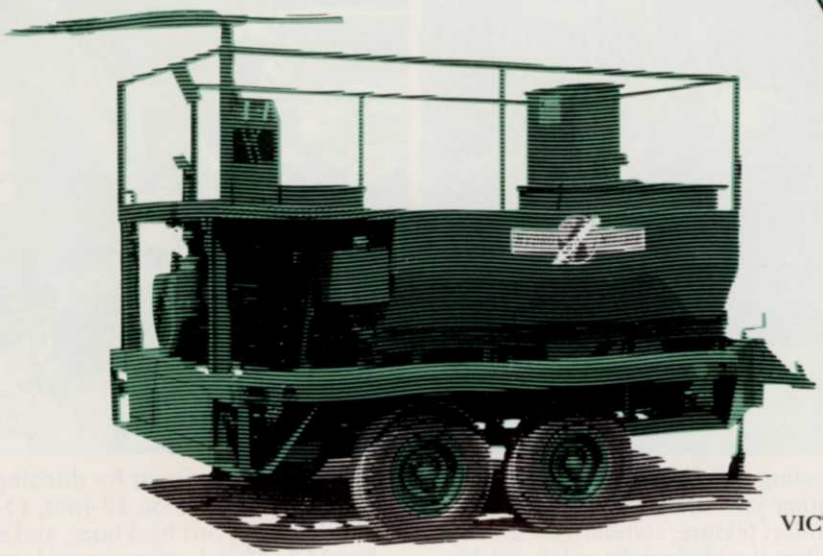

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Take your choice of eight flatbed trailers with loading ramps or tilt decks, plus a box bed trailer with tailgate. They're ideal for hauling grounds maintenance equipment and other bulky, hard-to-handle items.

Three trailers with ramps; two with perforated steel decks, one with wooden deck. Capacities 1,150 and 2,100 pounds.

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One steel box bed trailer with optional canvas or fiberglass cover. Capacity 1,200 pounds.

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Adjucide
Woodbury Chem. Co.

All-Wet
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Armix 181, 185
Arjay, Inc.

Clear Spray
W. A. Cleary Chem. Corp.

Compex
Kalo Labs, Inc.

Defoamer
W. A. Cleary Chem. Corp.
Hopkins Ag. Chem. Co.

Exhalt 800

PBI/Gordon

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Kalo Labs, Inc.

Liqua-Wet
Woodbury Chem. Co.

Nalco-Trol I, II
Nalco Chem. Co.

Nalco 2151
Nalco Chem. Co.

Nalquatic
Nalco Chem. Co.

Neptune
Hopkins Ag. Chem. Co.

Peptoil
Drexel Chem. Co.

Plyac
Hopkins Ag. Chem. Co.

Salvol
Thompson-Hayward Chem. Co.

Surf AC820
Drexel Chem. Co.

Triton AG-98, B-1956, CS-7
Rohm and Haas Co.

Uni-Mix
Thompson-Hayward Chem. Co.

Visko-Rhap Inverting Oil
Rhodia Inc.

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Auragreen
Mallinckrodt, Ind.

Grass-Greenzit
W. A. Cleary Chem. Corp.

Lake Dye
The C. B. Dolge Co.

Perma Green
International Research Union

Vitalon
Mallinckrodt, Inc.

Antitranspirants

Anti-dessicant Spray
The C. B. Dolge Co.

Exhalt 4-10
PBI/Gordon
Kay-Fries Chem.

Wilt Pruf
Nursery Specialty Prod.

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Woodbury Chem. Co.

Anilazene
Mobay Chem. Corp.
PBI/Gordon Corp.

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Hopkins Ag. Chem. Co.
Merck & Co.

Banrot
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E. I. duPont de Nemours Co., Inc.
Lebanon Chem. Corp.
Woodbury Chem. Co.

Bromosan
W. A. Cleary Chem. Corp.

Caddy
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Cadmium
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Cadmium Chloride
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Cadmium succinate
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Cadminate
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Calo-Gran
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Carbendazole
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Chipco Spot Kleen
Rhodia, Inc.

Chloroneb
E. I. duPont de Nemours Co., Inc.

Copper
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Correx
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Cycloheximide + PCNB
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Cycloheximide + Thiram
TUCO, Div. of the Upjohn Co.

Dachtal
Lebanon Chem. Corp.

Daconil 2787
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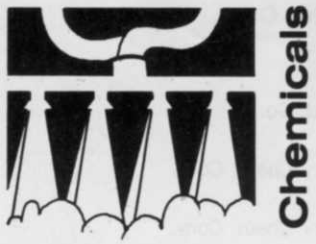

The C. B. Dolge Co.
Woodbury Chem. Co.

Dexon
Woodbury Chem. Co.

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PBI/Gordon Corp.

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Lesan
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Lescosan
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Maneb
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Piperalin
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Spotrete
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Woodbury Chem. Co.

Terrazole
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Woodbury Chem. Co.

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Mallinckrodt, Inc.
Rhodia Inc.
Woodbury Chem. Co.

Thiramad
Mallinckrodt, Inc.

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Topsin E, M
Pennwalt Corp.

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W. A. Cleary Chem. Corp.

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Embark
3M Co.

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Ethrel
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PoSan
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Retard
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Algimycin PLL-C
Great Lakes Biochem. Co., Inc.

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Ansar 529
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Asulam
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Lebanon Chem. Corp.

Banvel
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Velsicol Chem.
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Rhodia Inc.

Conquer
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Cutrine-Plus
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Cytrole Amitrole-T
American Cyanamid Co.

Decamine
Diamond Shamrock Corp.

Daconate
Diamond Shamrock Corp.

Dacthal
Diamond Shamrock Corp.
Lebanon Chem. Corp.

Dalapon
Dow Chem. USA

DCPA
Best Prod.

Dicamba
Velsicol Chem.

Dicamba + 2,4-d
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Dinitro Amine
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Kuron
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MCPP
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Mecoprop
PBI/Gordon Corp.

Methar 30
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Occidental Chem.

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Velsicol Chem.

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Rhodia Inc.

2,4-D + 2,4,5-T
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2,4-D + Dicamba + MCPP
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2,4-D + MCPP
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2,4,5-T
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2,4,5-TP
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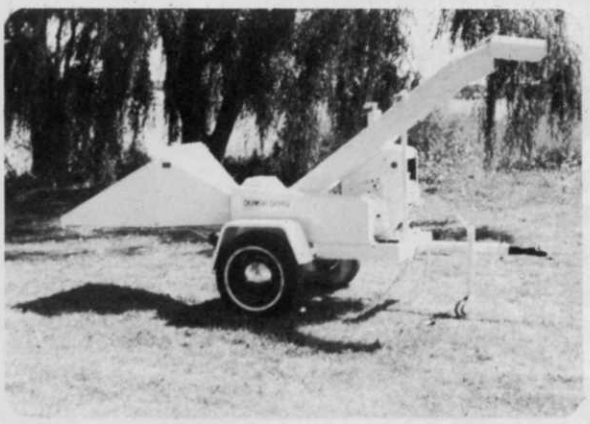

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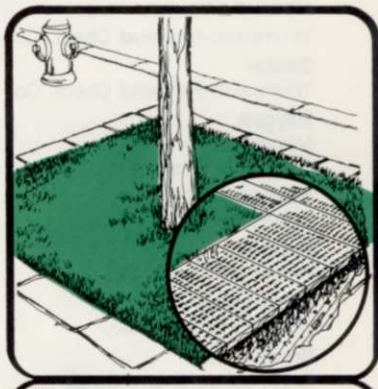

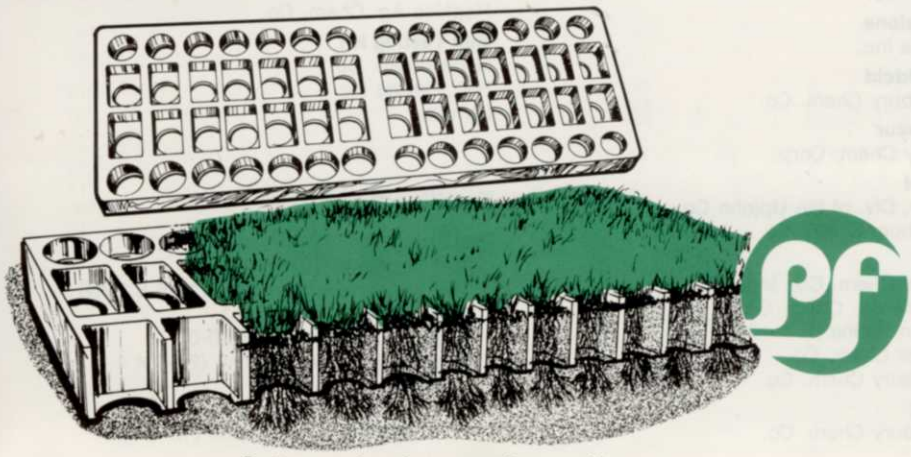

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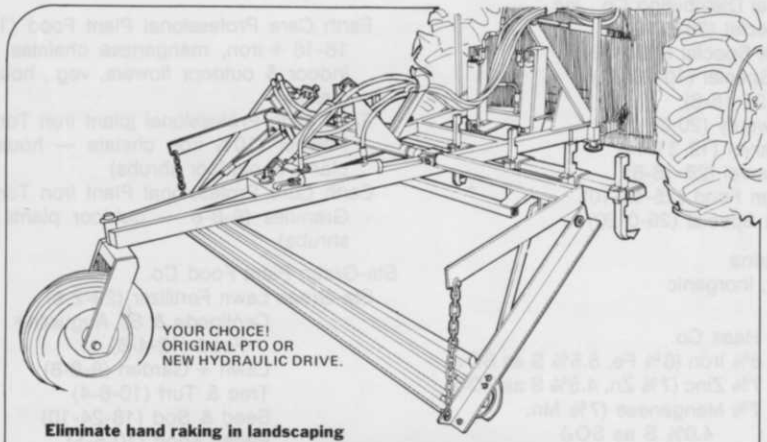

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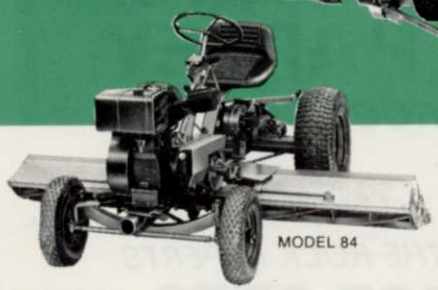
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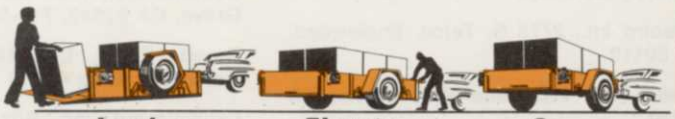

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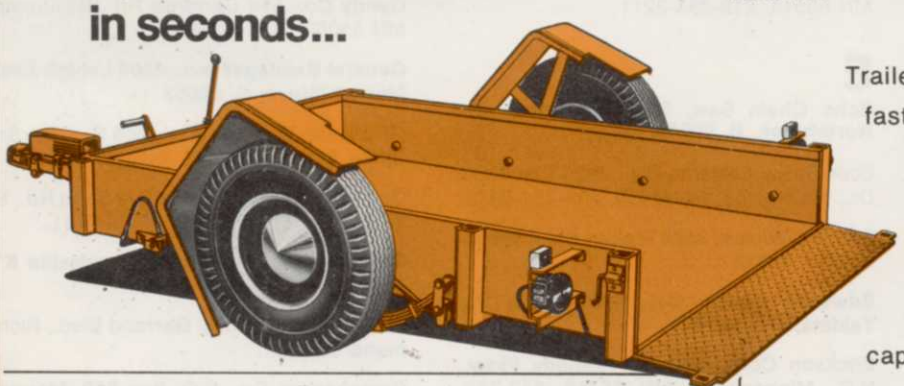

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Turf management 1979: Why it should start with TRIMEC® applied late this fall

Late fall dandelion control, not feasible before Trimec, today offers year-round benefits only Trimec can provide. Balanced workloads and ideal seasonal timing are two.

For you, the professional turf manager whose work bears the public spotlight, dandelions can be the scourge of the earth. They're ugly. Costly. Time-wasting. An irritant to everyone, both in and out of management. Dandelions — the turf spoilers. They've got to go!

But, before Trimec, the only dependable time to wipe out dandelions was spring — ideally, early spring (which is usually the windiest, rainiest, muddiest spray season of the year). Alternatives? None. Just spray — and let the other work wait.

And spray you did. But not without the knowledge that your gains would be short-lived. Because, in a few weeks, the *second* weedcrop would beg attention — Plantain, sorrel, chickweed, thistle (and more dandelions) — all flourishing because they sprouted too late for your *early* spray.

Obviously, the ideal time for controlling dandelions is late fall. But, before Trimec, you couldn't develop an effective fall program for controlling them, because even the best herbicides lacked cool-weather power.

Then Trimec was invented

Trimec is today's advanced herbicide that lets you wipe out most dandelions, and virtually all other broadleaf weeds, at the ideal time — mid-October to late November — in 50° temperature or cooler. This shifts much of the heavy spring workload to fall, when you have more time. Besides, your spring turf will be almost completely dandelion-free — having a few stragglers at most.

With a *fall* spray, you can skip the *early spring* dandelion treatment. And since you won't have to apply your main weed control until four to six weeks later, you'll have gained a month or more for other management functions — planning, maintenance, training, and so on. *Count the benefits:*

(1) **Late this fall** your sprays likely will encounter less wind, rain and mud than they would in February or March next year. Ornamentals, going dormant, are less prone to drift damage (they won't have spring's tender buds and foliage). Mowing is finished, reseeding completed; you have more time to work with your spray crew. And new grass is mature enough to resist herbicide damage.

(2) **Early next spring** you won't be plagued with that early rash of dandelions — you'll have killed virtually all of them last fall.

(3) **Later next spring,** four to six weeks later, your main Trimec application will get practically all the weeds then growing. Certainly, the timing fits better into your work schedule.

(4) **In all seasons** you can better manage your time for peak efficiency and balance the seasonal workloads, thus improve all of your management functions.

The Trimec formulation makes it possible

It's unique. Patent-protected. More effective, more cost-efficient than any other broadleaf herbicide. The ingredients themselves are not uncommon: 2,4-D, MCPP and Dicamba are well-known. But combined in the exclusive Trimec way their *synergism* (the interaction of the components) releases weedkill power much greater than the sum of their strength when used separately. Thus, even the uncommonly small amounts of Trimec chemicals become highly efficient.

The result is that acre for acre, dollar for dollar, weedkill for weedkill, Trimec costs less than any other herbicide. Field experience and test after test have proved it. Trimec also poses less threat to grasses, trees, flowers and ornamentals because there is little root absorption. The risk of drift damage is reduced, as well. Biodegradeable, trouble-free and gentle, Trimec is precisely formulated to eliminate the hazard of on-site mixing errors. Only Trimec has all these advantages:

- Controls the widest range of broadleaf weeds
- Gets hard-to-kill species with one treatment
- Wide safety margin for lawn grasses, ornamentals
- Minimum hazard from root absorption
- No vapor action after application
- Effective weed control in wide temperature range
- Unique formula overcomes water hardness problems
- Treated areas may be reseeded within two weeks
- Non-flammable and non-corrosive in use
- Product stable several years above 32° F.
- Biodegradeable: friendly to the environment

Sorting out the values

If you've been making unreasonable sacrifices of personal time and family interests to meet the demands of your work, Trimec is one way to give yourself a break.

See your local authorized Gordon Distributor. He stocks many superior turf products, including Trimec and Trimec Bentgrass formula, and can share some helpful experience in dandelion control. Give him a call today.

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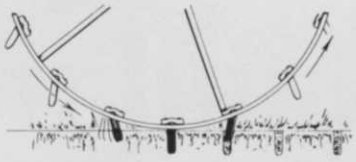

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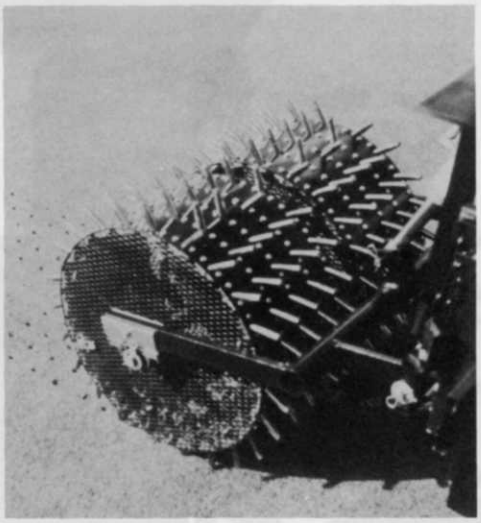

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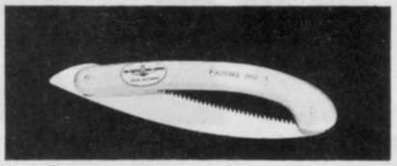

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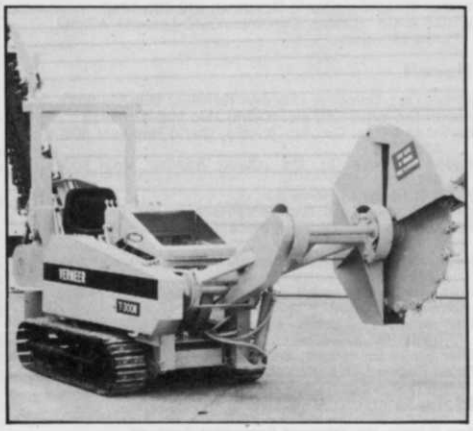

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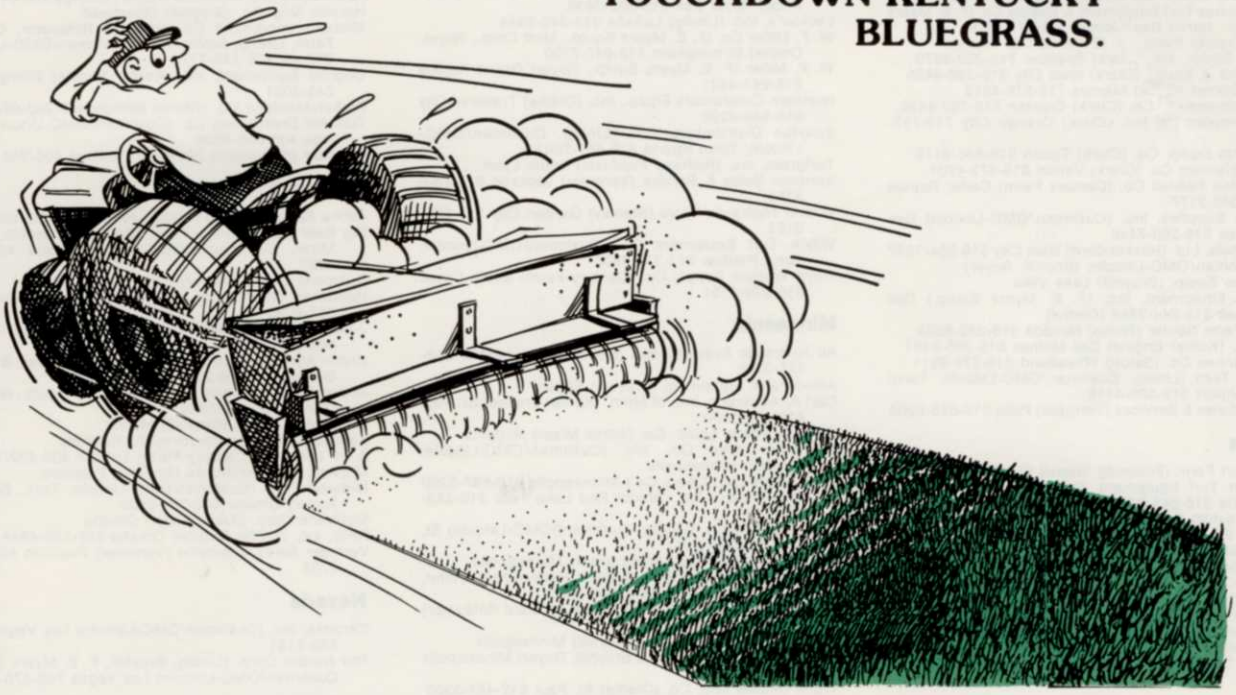

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Jack Dayton & Son, Inc. (Cushman/OMC-Lincoln, Olathe, Broyhill, Royer) Louisville 502-582-2505
Ky-Inna Turf Supply Co., Inc. (Heckendorn, Hahn) Louisville 502-491-8400
Torco Equip. Co., Louisville 800-626-1818
Vermeer South Central Sales & Service (Vermeer, Olathe) Bowling Green 502-842-8461

Louisiana

Emery Equip. Sales & Rentals, Inc. (Stanley) Baton Rouge 504-293-0541
Emery Equip. Sales & Rentals, Inc. (Stanley) Shreveport 318-425-7434
Grayson Co. of Louisiana, Inc. (Kohler Engine) Shreveport 318-222-3211
Gulf Shore Turf Supply (Lindig) Baton Rouge 504-293-6763
Hydradyne Hydraulics, Inc. (Stanley) Belle Chasse 504-394-7250
Reliable Distributors (Royer) River Ridge 504-737-9690
Southern Specialty Sales Co., Inc. (Heckendorn, Richway Products, Royer, Cushman/OMC-Lincoln) New Orleans 504-486-6101
Vermeer Sales & Service (Vermeer) Baton Rouge 504-355-4421
Wilbanks Farm Equipment (Broyhill) Shreveport

Maine

Yerxa's, Inc. (Lindig, F. E. Myers Equip., Toro) South Portland 207-799-2241

Maryland

Adams Equipment (Lindig, F. E. Myers Equip., Cushman/OMC-Lincoln) Baltimore 301-668-0500
Adams Equipment (Cushman/OMC-Lincoln, Lindig, F. E. Myers Equip., Broyhill, Toro) Silver Spring 301-585-1322
Agrotec Services, Inc. (Broyhill) Salisbury
S. M. Christholf & Sons (Arctic Mizer) Timonium
Cornell Chemical (Richway Products) Baltimore
G. L. Cornell Co. (Heckendorn, Cushman/OMC-Lincoln, Royer) Gaithersburg 301-948-2000
C. V. Foster Equipment Co. (Kohler Engine) Baltimore 301-235-3351
General Supply & Equip. Co. (Olathe) Baltimore 301-235-6300
Lyons & Lyons Sales Co., Inc. (Howard Price) Glen Arm 301-665-6500
Vermeer Sales & Service (Vermeer) Anapolis Junction 301-498-5200

Michigan

Burke Rental Service, Inc. (Royer) Sterling Heights 313-939-4400
Buryl Hill, Inc. (Foxcraft) Farmington 313-478-1000
Calumet Industrial Equip. (Arctic Mizer) So. Holland
Ellis Sales, Inc. (Cushman/OMC-Lincoln) Kalamazoo 616-375-3535
Ferguson's Lawn Equipment (Heckendorn) Traverse City 616-946-2440
Golf Car Distributors (Cushman/OMC-Lincoln) Pontiac 313-338-0425
Lawn Equipment Corp. (Heckendorn, Hahn, Howard Price) Royal Oak 313-398-3636
Leckler's, Inc. (Lindig) LaSalle 313-242-2344
W. F. Miller Co. (F. E. Myers Equip., Mott Corp., Royer, Olathe) Birmingham 313-647-7700
W. F. Miller (F. E. Myers Equip., Royer) Grand Rapids 616-241-4481
Northern Contractors Equip., Inc. (Olathe) Traverse City 616-946-8220
Spartan Distributors, Inc. (Lindig, Cushman/OMC-Lincoln, Toro) Sparta 616-887-7301
Turfgrass, Inc. (Richway Products) South Lyon
Vermeer Sales & Service (Vermeer) Jackson 517-750-3783
Walker Hydraulic Tools (Stanley) Garden City 313-525-0163
Wilkie Turf Equipment Co. (Cushman/OMC-Lincoln, Toro) Pontiac 313-372-8800
Floyd Wonser Supply Co. (Century Farm) Battle Creek 616-979-1151

Minnesota

Air Hydraulic Systems, Inc. (Stanley) Minneapolis 612-377-2342
Allied Farm Equipment (Broyhill) Eagan
Carl A. Anderson, Inc. of Minn. (Kohler Engine) St. Paul 612-452-1450
Coffey's Power Equip. Co. (Arctic Mizer) Hopkins
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Zeco Co. (Arctic Mizer) Minneapolis

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Farmers, Inc. (Broyhill) Greenville
Pedigo Equip. Corp. (Stanley) Jackson 601-939-6970
Vermeer Sales & Service (Vermeer) Pearl 601-932-3226

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Beckmann Turf & Irrigation (F. E. Myers Equip., Lindig, Toro) Chesterfield 314-532-3649
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Ozark Farm Equipment (Howard Price) Cuba
Dick Proctor Imports, Inc. (Satoh) St. Louis 314-487-2085
Robison's Lawn & Golf (Heckendorn, Broyhill, Richway Products, Royer, Olathe, Howard Price) Grandview 816-765-3333
Vermeer Sales & Service (Vermeer) Manchester 314-227-2211

Massachusetts

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Clapper Co. (Lindig, F. E. Myers Equip., Toro, Cushman/OMC-Lincoln) West Newton 617-244-7900
W. J. Connell Co. (Kohler Engine) Newton Upper Falls 617-332-3630
O. R. Cote Co. (Arctic Mizer) Springfield
Doering Equip. Corp. (Stanley) Westborough 617-366-8271
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The Magovern Co., Inc. (Cushman/OMC-Lincoln, Royer) Pittsfield 413-443-4459
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Sawtelle Bros., Inc. (Olathe, Howard Price, Royer, Cushman/OMC-Lincoln) Swampscott 617-599-4856
J. S. Woodhouse Co., Inc. (Howard Rotavator) W. Springfield 413-736-5462

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Agricultural Mgmt. Serv. (Broyhill) Great Falls
Agro Supply (Broyhill) Billings
Automotive and Industrial (Royer) Billings 406-245-6443
Horvick Mfg. Co. (Broyhill) Moorhead
Midland Implement Co. (Howard Rotavator, Century Farm, Lindig, Satoh, Toro, Cushman/OMC-Lincoln) Billings 406-248-7771
Original Equipment, Inc. (Kohler Engine) Billings 406-245-3081
Parker-Montana Co. (Rhino) Billings 406-245-6627
Turf-Aid Distributing Co. (Cushman/OMC-Lincoln) Billings 406-656-8008
Vermeer of Montana (Vermeer) Billings 406-248-7710

Nebraska

Asche Sales (Howard Price) Creston 402-285-0260
Big Bear Equipment (Lindig, Richway Products, Arctic Mizer, Cushman/OMC-Lincoln) Omaha 402-331-2220
Dultmeier Sales (Master) Omaha 402-333-1444
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J-Mac Corp. (F. E. Myers Equip., Howard Price) Omaha 402-331-5121
Jirdon Agri Chemicals, Inc. (F. E. Myers Equip., Broyhill) Gering 308-436-2166
Jirdon Agri Chemicals, Inc. (F. E. Myers Equip., Broyhill) Morrill 308-247-2129
Jirdon Agri-Chem (Broyhill) Morrill
Kearney Farm Service (Broyhill) Kearney
A. H. Lock Co. (Century Farm) Lincoln 402-432-1445
Midwest Ag. Warehouse (Broyhill) Fremont
Midwest Toro (Cushman/OMC-Lincoln, Toro, Broyhill, Royer) Omaha 402-331-0500
McShane Corp. (Arctic Mizer) Omaha
RPW, Inc. (Kohler Engine) Omaha 402-339-4944
Vermeer Sales & Service (Vermeer) Papillion 402-331-7755

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The Norton Corp. (Lindig, Broyhill, F. E. Myers Equip., Cushman/OMC-Lincoln) Las Vegas 702-876-8330

New Hampshire

John L. Cyr (Royer) Windham 603-893-8003
R. N. Johnson, Inc. (Century Farm) Walpole 603-756-3321
Turf Specialties, Inc. (Hahn) Hooksett 603-436-8202

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Caldwell Tractor & Equipment (Lindig) Fairfield 201-227-6772
Double Eagle Golf Products (Cushman/OMC-Lincoln) Jamesburg 201-521-2500
The Durham Co., Inc. (Kohler Engine) East Brunswick 201-238-3200
Ferti-Soil Co. (Richway Products, Hahn) Rahway 201-388-0100
Jep Sales (Lindig, Howard Price) Yardville 609-585-2300
Lawn-A-Mat of Mountainside (Broyhill) Millington
Lehara Equipment Co., Inc. (Mott Corp.) East Brunswick 201-238-3322
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Matcha Machinery Co. (Arctic Mizer) Fairfield
Wm. Potter & Son (Howard Price) Middletown
L. D. Sealy Co. (Arctic Mizer) Wamamassa
L. D. Seely Co. (Olathe) Ocean 201-531-8511
Sherwood Chemical (Tuflex) Westerville 609-848-6811
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Southwest Toro New Mexico, Inc. (Cushman/OMC-Lincoln, Broyhill, Royer) Albuquerque 505-345-8676
Spitzer Electrical Co. (Kohler Engine) Albuquerque 505-247-4233
Vermeer Sales & Service of New Mexico (Vermeer) Albuquerque 505-344-5141

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Brooks Gravely Co., Inc. (Howard Price) Rochester 716-424-1660
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S. V. Moffet (Heckendorn, Lindig, Richway Products, Cushman/OMC-Lincoln, Broyhill) West Henrietta 716-334-0100
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Orag Inter Ltd. (Olathe) Flushing 212-353-8699
Howard Premo, Inc. (Royer) Masseno 315-769-2377
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Vermeer Sales & Service (Vermeer) East Moriches, L.I. 516-878-4000
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York Chemical Co., Inc. (Tuflex) Garden City Park, L.I. 516-741-4301

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Baker Equip. Engr. Co. (Stanley) Charlotte 704-372-2040
Eastern Turf Equipment, Inc. (Hahn) Fayetteville 919-483-0179
Engine Service Products (Master) Charlotte
Porter Brothers (Lindig, Broyhill, Olathe, Cushman/OMC-Lincoln, Mott Corp., F. E. Myers Equip., Richway Products, Heckendorn) Shelby 704-482-3424
Revels' Tractor Co., Inc. (Howard Price) Fuquay-Varina 919-552-5697
E. J. Smith & Sons Co. (Satoh, Cushman/OMC-Lincoln, Toro, Royer) Charlotte 704-394-3361
Smith Hardware Co. (Century Farm) Goldsboro 919-735-6281
Vermeer Carolinas Sales & Service (Vermeer) Charlotte 704-333-4647
Vermeer Carolinas Sales & Service (Vermeer) Fayetteville 919-484-5438

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Butler Industrial Products & Irrig. (Cushman/OMC-Lincoln) Fargo 701-235-6454
Butler Irrigation & Indust. Div. (Cushman/OMC-Lincoln) Bismark 701-223-0890
Minot Coleman Dist. (Broyhill) Minot
Mon-Dak Chemical & Supply, Inc. (F. E. Myers Equip.) Minot 701-852-1268
Vermeer Sales & Service (Vermeer) Turtle Lake 701-448-2593
Westland Oil Co. (Broyhill) Minot

Ohio

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Brooklyn Tractor & Mower (Lindig, Howard Price) Cleveland 216-661-2220
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Dayton Ford Tractor (Lindig) Vandalia 513-898-1352
John Deere Co. (Deere Co.) Columbus 614-276-6171
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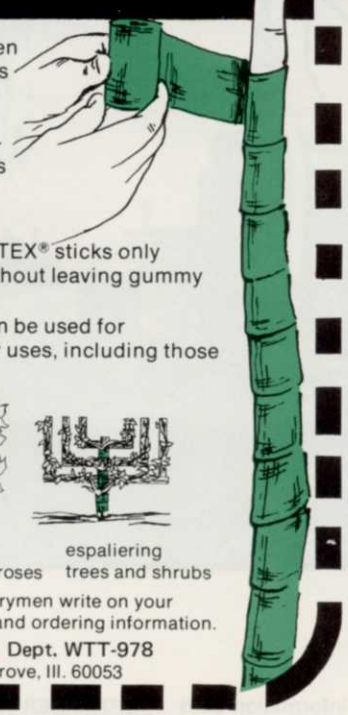

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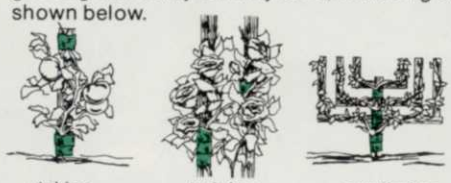

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Turf & Garden Equipment Co. (Howard Price) Hershey 717-534-2590

Rhode Island

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Herrington, Inc. (Howard Price) Hollywood 803-889-2206
Turf & Garden (Howard Price) Murrells Inlet

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Bob Ladd & Assoc., Inc. (Cushman/OMC-Lincoln) Memphis 901-324-8801
Liles & Tippit Inc. (F. E. Myers Equip., Hahn) Collierville 901-853-0246
Tennessee Electric Motor Co. (Cushman/OMC-Lincoln) Nashville 615-255-7331
Tennessee Turf & Toro Co. (Cushman/OMC-Lincoln, F. E. Myers Equip.) Knoxville 615-522-1141
Tieco Tennessee, Inc. (Heckendorn, Olathe, Broyhill, Royer) Nashville 615-242-4483
Turfaid Inc. (Lindig, (Cushman/OMC-Lincoln, Toro) Memphis 901-332-8770
United Equipment (Stanley) Memphis 901-362-3718
Vermeer Equipment of Tennessee, Inc. (Vermeer) Lenoir City 615-966-3298
Vermeer-Memphis, Inc. (Vermeer) Memphis 901-353-4835
The Bill Voorhees Co. (Satoh) Nashville 615-242-4483
Howard Wakefield (Howard Price) Nashville
Wallace Hardware Co., Inc. (Century Farm, Howard Rotavator) Morristown 615-586-5650
Wilson, Weesner & Wilkinson (Stanley) Nashville 615-254-1811
Wilson, Weesner & Wilkinson (Stanley) Johnson City 615-477-3114
Wilson, Weesner & Wilkinson (Stanley) Chatanooga 615-266-6739
Wilson, Weesner & Wilkinson (Stanley) Knoxville 615-525-0404

Texas

A & G Vermeer Sales (Vermeer) Irving 214-259-1574
Alamo Machinery Co. (F. E. Myers Equip.) San Antonio 512-226-8219
Austin Products, Inc.(Rhino) Dallas 214-651-0733
Associated Supply Co., Inc. (Cushman/OMC-Lincoln) Amarillo 806-372-8386
Associated Supply Co., Inc. (Cushman/OMC-Lincoln) Lubbock 806-747-2893
B & C Turf Equipment Co. (Hahn) El Paso 915-778-6718
Bell Co., Inc. (Cushman/OMC-Lincoln) El Paso 915-584-5793
Binnion & Assoc., Inc. (Heckendorn) Amarillo 806-352-8181
Boyds Equipment, Inc. (Broyhill) Amarillo
Chemical & Turf Specialty Co. (Royer, F. E. Myers Equip.) Dallas
CISCO (Broyhill) Amarillo
Colonial Motor Co. (Lindig, Olathe) Dallas 214-421-5293
Connally Impl. Supply Co. (Howard Rotavator) Amarillo 806-376-5343
Connally Impl. Supply Co. Inc. (Broyhill) Grand Prairie
John Deere Co. (Deere Co.) Dallas 214-352-1701
Estes Chemicals Inc. (F. E. Myers Equip.) Wichita Falls 817-766-0163
Goldthwaite's of Texas, inc. (Royer) Houston 713-666-4233
Goldthwaite's of Texas, inc. (Royer) Dallas 214-241-3101
Goldthwaite's of Texas, inc. (Royer) San Antonia 512-653-9660
Goldthwaite's of Texas, inc. (Toro, Royer) Ft. Worth 817-332-1521
Outdoor Equipment Inc. (Hahn) Houston 713-784-2560
Peerless Equipment Corp. (Stanley) Houston 713-926-1741
Peerless Equipment Corp. (Stanley) Dallas 214-351-3704
Peerless Equipment Corp. (Stanley) Long View 214-758-0727
R & W Supply Co. (Broyhill) Littlefield
Southwest Toro, Inc. (F. E. Myers Equip, Cushman/OMC-Lincoln, Broyhill) EL Paso 915-542-1671
Spyder of Texas (Foxcroft) Needville 713-342-6649
T & C Equipment Co. (Hahn, Broyhill) Hurst 817-268-2406
The Stewart Co. (Satoh) Dallas 214-691-5555
Tri-State Equipment Co. (Kohler Engine) El Paso 915-532-6931
Vermeer Sales & Service (Vermeer) Lubbock 806-762-0609
Vermeer Sales of Texas (Vermeer, Olathe) Houston 713-643-6533
Vermeer Sales of Texas (Vermeer) San Antonia 512-337-7700
Ware Implement Distributors (Century Farm) San Antonia 512-732-5991
Watson Distributing Co., Inc. (Howard Price, Heckendorn, Cushman/OMC-Lincoln) Dallas 214-630-2222
Watson Distributing (Cushman/OMC-Lincoln, Lindig, Richway Products, Heckendorn, Howard Price) Houston 713-771-5771
Watson Distributing (Lindig, Heckendorn, Howard Price, Cushman/OMC-Lincoln) San Antonia 512-654-7065
Waukesha-Pearce Industries, Inc. (Kohler Engine) Houston 713-723-1050

Utah

Stan Bonham Co. (Broyhill) Salt Lake City
Diesel Electric Service & Supply Co. (Kohler Engine) Salt Lake City 801-972-1836
General Implement Distributors (Rhino, Century Farm) Salt Lake City 801-972-4321
Boyd Martin Co. (Cushman/OMC-Lincoln, Howard Price, Olathe, Lindig, Foxcroft, Broyhill) Salt Lake City 801-521-7202
Steve Regan Co. (F. E. Myers Equip.) Salt Lake City 801-268-4500
Turf Equipment Co. (Broyhill) Salt Lake City 801-972-4164
Vermeer Intermountain (Vermeer) Salt Lake City 801-521-0230

Virginia

Baker Equipment Eng. Co. (Stanley) Richmond 804-358-0481
Capital Equipment Co. (Royer) Richmond 804-262-7341
Cavalier Equipment Co. (Olathe) Roanoke 703-345-7441
R. P. Johnson & Sons, Inc. (Hahn) Wytheville 703-228-5414
RBI Corporation (Kohler Engine) Richmond 804-359-3531
Richmond Power Equipment Co., Inc. (Cushman/OMC-Lincoln, Toro, Broyhill) Richmond 804-355-7831
Stevenson Ford Tractor, Inc. (Howard Price) Chesapeake 804-420-4220
Todd Farm Equipment (Howard Rotavator) Chesapeake 804-543-2071
Universal Tractor Equipment Corp. (Satoh) Richmond 804-353-7806
Vermeer Sales & Service (Vermeer) Glen Allen 804-262-5558
Wolff Brothers (Lindig) Richmond 804-353-9513

Washington

Ackley Hydraulic Tool Co. (Stanley) Kirkland 206-827-8611
Agrichem, Inc. (Broyhill) Burlington
Audubon Sales, Inc.(Cushman/OMC-Lincoln) Spokane 509-325-2527
Automotive Jobbers Supply Co. (Kohler Engine) Spokane 509-624-2291
Paul Haggard Co. (Olathe) Seattle 206-244-8600
Inland Toro Distributors, Inc. (Cushman/OMC-Lincoln, Lindig, F. E. Myers Equip.) Spokane 509-535-9756
J. M. McConkey & Co., Inc. (Royer) Sumner 206-863-8111
Mid-Mountain Machinery (Vermeer) Spokane 509-535-9756
N. W. Mowers, Inc. (Royer) Seattle 206-542-7478
Northwest Motor Parts & Mfg. Co. (Kohler Engine) Seattle 206-624-4448
Northwest Mowers, Inc. (Howard Price, Richway Products, Olathe) Seattle 206-542-7484
PAPSCO, Inc. (F. E. Myers Equip.) Seattle 206-624-3853
Rayco Distributing (Foxcroft) Spokane 509-483-6404
Sperry New Holland-Pasco (F. E. Myers Equip.) Pasco 509-547-1795
Sunset Northwest (Cushman/OMC-Lincoln) Bellevue 206-455-5640
Theedshort Co. (Mott Corp.) Seattle 206-575-0281
Turf & Toro (Cushman/OMC-Lincoln, Lindig, F. E. Myers Equip., Toro) Kent 206-762-7242

West Virginia

Baker Equipment Engr. Co., Inc. (Toro, Royer, F. E. Myers Equip., Cushman/OMC-Lincoln) Charleston 304-344-3441

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Bob Eisen (Jeep) (Arctic Mizer) Milwaukee
L. F. George Co. (Rhino, Century Farm) Oconomowoc 414-567-6666
HASCO (Master) Ft. Atkinson 414-445-2800
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Kujawa Enterprises, Inc. (Howard Price) Cudahy 414-744-7646
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Van's Supply & Equipment, Inc. (Howard Price) Green Bay 414-499-0606
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Vermeer Sales & Service (Vermeer) West Salem 608-786-1910
Wisconsin Magneto, Inc. (Kohler Engine) Milwaukee 414-445-2800
Wisconsin Turf Equipment Corp. (Cushman/OMC-Lincoln, Royer, Olathe) Janesville 608-752-8766
Wisconsin Turf Equipment Corp. (Royer) New Berlin 414-544-6421

Wyoming

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Continues on page 62

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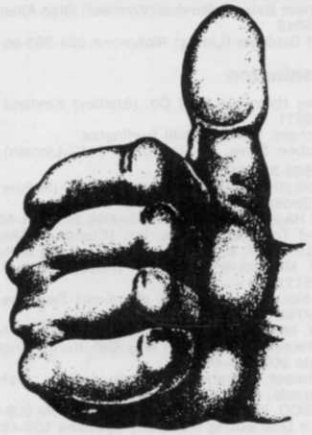

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Consolidated Western Industry Co. (Heckendorn, Cushman/OMC-Lincoln) Calgary 403-243-1599
Gem Equipment Sales (Foxcroft) Edmonton
Charles Henry (Royer) Calgary 403-272-1319
Interprovincial Turf Ltd. (Olathe, Howard Price, Royer) Calgary 403-243-5180
Interprovincial Turf Ltd. (Mott Corp, Olathe, Howard Price, Royer) Edmonton 403-436-6560
Oliver Industrial Supply Co. Ltd. (Century Farm) Lethbridge 403-327-1571
Power Electric & Equipment Co. Ltd. (Kohler Engine) Calgary 403-276-7761
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United Farmers of Alberta (Broyhill) Calgary
Westcan Horticulture, Ltd. (Royer) Calgary 403-266-5688

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Bulter Brothers Dist. (Howard Rotavator) Langley 604-530-0221
Coast Arborist Supplies (Stanley) Langley 604-530-7717
Coast Dieselec Ltd. (Kohler Engine) Vancouver 604-872-5201
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Multi-Turf Specialists Ltd. (Heckendorn) Delta 604-946-7011
Taylor Pearson & Carson (Lindig) Vancouver 604-433-2481
Vermeer Industrial Products, Ltd. (Vermeer) Langley 604-536-6221

Manitoba

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City Machinery Ltd. (Cushman/OMC-Lincoln) Winnipeg 204-889-4062
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Mumford, Medland, Ltd. (Vermeer) Winnipeg 204-885-4440
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Utility Equipment Service Co. Ltd. (Stanley) Winnipeg 204-452-6539
Yetsmans Ltd. (Kohler Engine) Winnipeg 204-586-8046

New Brunswick

Atlantic Clarklift Ltd. (Ericson Corp.) St. John 506-657-2720
Maritime Farm Supply Ltd. (Mott Corp.) Moncton 506-382-4443

Nova Scotia

Atlantic Clarklift Ltd. (Erickson) Halifax 902-453-0170
Halifax Seed Co. (Royer) Halifax 902-454-7456
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W. N. White Co. Ltd. (Kohler Engine) Halifax 902-443-5000

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John Deere Ltd. (Deere Co.) Grimsby 416-945-9281
Duke Lawn Equipment (Broyhill, Cushman/OMC-Lincoln, Heckendorn, Lindig, Mott Corp., Howard Price, Hahn) Burlington 416-637-5216
Fairlawn Equipment Sales (Foxcroft) Lynden 519-647-3481
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Homelite-Terry-Textron (Wheel Horse) Toronto 416-244-5613
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Spraymotor Ltd. (Olathe) Ottawa
Spraymotor Ltd. (Olathe) Rexdale
Suntester Equipment (Central) Ltd. (Kohler Engine) Toronto 416-251-1165
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Vermeer of Canada (Vermeer) Mississauga 416-277-3608
Wajax Industries Ltd. (Stanley) Markham 416-495-0629

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Forano Ltd., Farm Implement Div. (Century Farm, Howard Rotavator) Plessisville 819-362-7395
Interprovincial Equipment Ltd. (Vermeer) Pointe-Claire 514-695-3320
Morin Equipment Ltee. (Lindig, Cushman/OMC-Lincoln) Longueuil 514-527-3406
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O. J. Company (Hahn, Howard Price) Sherrington 514-861-5379
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Spraymotor Ltd. (Olathe) Montreal
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Altex Nursery Supply, (Sta-Green Corp.), Seemes
Cassco, (Elanco, Mallinckrodt), Montgomery, 205-272-2140
Chase Nursery Co., Inc., (Elanco), Huntsville
Ibsen Seed Company, Inc., (Elanco), Mobile
Montgomery Seed & Supply, (Sta-Green Corp.), Montgomery
Norala Company, (PBI-Gordon), Birmingham, 205-323-3491
Pennwalt, (Pennwalt), Prattville, 205-365-8897
Thompson Hayward, (Fisons, Thompson Hayward, Velsicol), Birmingham, 205-323-6101
(Thompson Hayward), Huntsville, 205-536-4121
(Thompson Hayward), Mobile, 205-457-5316
(Thompson Hayward), Montgomery, 205-269-4314; 205-264-4543
(Thompson Hayward), Muscle Shoals, 205-381-2420
Tieco, (Elanco, Mallinckrodt, PBI-Gordon), Birmingham, 205-328-6464
(Mallinckrodt, PBI-Gordon), Montgomery, 205-834-3705

Arizona

Arizona AgriChemicals, (Elanco, PBI-Gordon), Phoenix, 602-244-1311
Capitol Nursery Supply, (Best Prod., Creative Sales, Elanco, PBI-Gordon), Phoenix, 602-272-5508
Copper State Chemical Co., (PBI-Gordon), Tucson, 602-622-3694
General Control, Inc., (Elanco), Tucson
Lawn & Garden Supply, (Mallinckrodt), Phoenix
Target Chemical Co., (Velsicol), Phoenix, 602-272-6867

Arkansas

Arkansas Nursery & Landscaping, Inc., (Elanco), North Little Rock
Brogdon Spray Supplies, (Velsicol), Springdale, 501-751-4729
Capital Equipment Co., (Mallinckrodt, PBI-Gordon, Velsicol), Alexander, 501-847-3057
(Elanco), Little Rock
Rupert Crafton Commission Co., (Elanco), Blytheville
Paul Hanshaw Chemical Co., Inc., (Elanco), Jonesboro
Southern Farmers Assn., (Elanco), North Little Rock
Thompson Hayward, (Thompson Hayward), Little Rock, 501-565-8446

California

Abate-A-Weed, (Best Prods., Elanco, PBI-Gordon), Bakersfield, 805-589-0615
Agri-Turf Supplies, (Creative Sales, Elanco, PBI-Gordon, Velsicol), Santa Barbara, 805-963-3691
Albers Feed & Farm Supply, (Best Prods.), Pleasanton, 415-846-3276
Albers, Inc., (Best Prods.), Reno, 702-322-8625
George Ball Pacific, (Elanco, Mallinckrodt), Sunnyvale, 408-738-4700
Butler's Mill, (Best Prods., Creative Sales, Elanco, PBI-Gordon), San Diego, 714-263-6181
Caceres Chemical Company, (Best Prods., Elanco, Mallinckrodt), Los Angeles, 213-876-1460
Calif. Chrysanthemum Growers, (Mallinckrodt), Palo Alto, 415-321-1451
Coastal Ag Chemical, (Best Prods.), Escondido
(Best Prods.), Fillmore, 805-524-2460
(Best Prods.), Goleta, 805-964-3501
(Best Prods.), Lompoc
(Best Prods., Elanco, Mallinckrodt, PBI-Gordon), Oxnard, 805-487-4691
(Best Prods.), San Jacinto, 714-654-4210
Country Farm Supply, (Best Prods., Elanco), Chino, 714-628-3401
Custom Chemilene, (PBI-Gordon), San Leandro, 415-638-4668
Dario Bonfantini, (Best Prods.), Daly City, 415-755-5210
Eagle Chemical, (Best Prods., PBI-Gordon), Santa Clara, 408-988-6866
Eagle Chemical Company, (PBI-Gordon), Anaheim, 714-761-2521
Empire Ag Chemical, (Best Prods.), Empire, 209-527-0450
Encinitas Growers Supplies, (Elanco, Mallinckrodt), Encinitas, 714-753-2532
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Foster & Gardner, (Best Prods., Elanco, PBI-Gordon), Coachella, 714-398-6151
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Interlink Agriculture Chemicals, Inc., (Best Prods., Creative Sales), Modesto, 209-521-2390
Jack's Orchard Supply, (Best Prods.), Chico, 916-343-4552
James Grain Company, (Best Prods.), San Jose, 408-293-5732
L & V Farm Sales, (Best Prods., Elanco), Fremont, 415-792-4031
(PBI-Gordon), Newark, 415-792-4031
Los Angeles Chemical, (Best Prods., Elanco, PBI-Gordon), Southgate, 213-583-4761
J. Harold Mitchell, (Best Prods.), San Gabriel, 213-287-1101
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Monterey Chemical Company, (Elanco), Fresno
Moyer Chemical, (Elanco, Mallinckrodt, PBI-Gordon), San Jose, 408-297-8088
Moyer Chemical Company, (PBI-Gordon), Santa Ana, 714-949-2871
Nilsen Company, (Best Prods.), Eureka, 707-442-3741
Northern California Fertilizer, (Best Prods., Elanco, PBI-Gordon), San Jose, 408-292-7957
Nurserymen's Exchange, (Elanco, Mallinckrodt), San Francisco, 415-392-0078
Occidental Chemical Company, (Elanco), Lathrop
Orange County Farm, (Best Prods.), Orange, 714-633-8682
Orchard Supply, (Best Prods., Elanco, PBI-Gordon), Sacramento, 916-446-7821
Oxychem Brentwood, (Best Prods.), Brentwood, 415-634-1155
Oxychem Hughson, (Best Prods.), Hughson, 209-883-4447
Oxychem Live Oak, (Best Prods.), Live Oak, 916-695-2181
Oxychem Stockton, (Best Prods.), Stockton, 209-464-8328
Pennwalt, (Pennwalt), Fresno, 209-435-2500
Plant Gro Corporation, (Elanco, Mallinckrodt, Velsicol), San Jose, 408-292-4332
Preston Weed Control Co., (Elanco), Whittier
PureGro Company, (Elanco), Los Angeles
(Elanco), Stockton
Purity Chemical Company, (Best Prods., PBI-Gordon), Santa Rosa, 707-546-2585
Ramsey Seed Company, (PBI-Gordon), Manteca, 209-833-1721
Reno Ranch & Sprinkler Supply Co., (Best Prods.), Reno, 702-826-5022
Ripon Farm Service, (Best Prods.), Ripon, 209-599-2188
Robinson Fertilizer Company, (Best Prods., Creative Sales, Elanco, Mallinckrodt, PBI-Gordon), Orange, 714-538-3575
San Joaquin Sulfur Company, (Best Prods.), Lodi, 209-368-6676
Sanders Plant Foods, (Best Prods.), Santa Maria, 805-937-7191
Seeley's Nursery, (Best Prods.), Fresno, 209-442-8118
Sierra Moreno Merc. Co., (Creative Sales), Mountain View, 415-967-4676
F. F. Smith Company, (Best Prods.), Sacramento, 916-371-7830
Target Chemical Co., (Best Prods., Elanco, Fisons, Mallinckrodt, PBI-Gordon, Velsicol), Carritos, 213-865-9541
(Elanco, Best Prods., PBI-Gordon, Velsicol), San Jose, 408-293-6032
John Taylor Fertilizer, (Best Prods.), Sacramento, 916-443-6591
Thompson Hayward, (Thompson Hayward), Brea, 714-529-3973; 213-694-2048
(Thompson Hayward), Fresno, 209-251-7144
(Thompson Hayward), Yakima, 509-453-5575
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Viola Seed Company, (Mallinckrodt), San Francisco, 415-585-8234
Wilbur-Ellis Company, (Mallinckrodt, PBI-Gordon), Chula Vista, 714-422-5321
(Elanco, Mallinckrodt), Los Angeles, 213-685-8579
Winton Ag Chemical, (Best Prods.), Wincon, 209-358-7189
Yamada Company, (Best Prods.), Gardena, 213-324-1337

Colorado

American Fertilizer & Chem. Co., (Elanco), Henderson
Balcom Chemicals Inc., (Fisons), Greeley, 303-356-4400
Boyd Distributing Co., (Mallinckrodt), Denver
Denver Wholesale Florists, (Elanco, Mallinckrodt), Denver, 303-399-0970
Gorby, Inc., (PBI-Gordon), Colorado Springs, 303-598-1539
Great Western Sugar Company, (Fisons), Denver, 303-893-4600
L. L. Johnson Distributing Co., (Mallinckrodt), Denver
Pueblo Chemical & Supply, (PBI-Gordon), Pueblo
Randall Industries, (Creative Sales), Grand Junction, 303-242-3787
S.A.J. Turf Products, (PBI-Gordon), Westminister, 303-426-4164
Swingle, Inc., (Creative Sales), Denver, 303-399-2301
Thompson Hayward, (Thompson Hayward), Denver, 303-321-3802
(Thompson Hayward), Grand Junction, 303-245-0408
United Fruit Growers Assn., (Creative Sales), Palisade, 303-464-5671
Van Waters & Rogers, (Mallinckrodt, PBI-Gordon, Velsicol), Denver, 303-388-5651

Connecticut

Cadwell & Jones, Inc., (Elanco, Velsicol), East Hartford, 203-289-9555
C. B. Dolge Company, (PBI-Gordon), Westport, 203-227-9591
Magovern Company, (Mallinckrodt), Fairfield
(Mallinckrodt), Wincsor Locks
Muench Co., Inc., (Creative Sales), Stamford, 203-323-9712
Old Fox Chemical Co., (PBI-Gordon, Velsicol), Hazardville, 203-749-8339
Emanuel Shemin Horticulturist, (Elanco, PBI-Gordon), Greenwich, 203-531-7352
Somers Turf Supplies, (PBI-Gordon), Devon, 203-878-2108
Thompson Hayward, (Thompson Hayward), Cheshire, 203-272-4866
Turf Products Corporation, (Elanco, PBI-Gordon), So. Windsor, 203-289-3471

Florida

Apopka Growers Supply, (Elanco, Mallinckrodt, Velsicol), Apopka, 305-886-5555
Asgrow Florida Company, (Mallinckrodt), Plant City, 813-752-1177
Atlantic Fertilizer and Chemical Co., (Mallinckrodt), Apopka, 305-889-2111
(Elanco, Mallinckrodt, PBI-Gordon, Velsicol), Homestead, 305-247-8800
Bingham Seed Company, (Elanco, PBI-Gordon, Velsicol), Jacksonville, 904-768-1503
Chase & Company, (Elanco, PBI-Gordon, Velsicol), Sanford, 305-322-4552
Gulf Shore Turf Supply, Inc., (Mallinckrodt, PBI-Gordon, Velsicol), Pensacola, 904-968-2183
Hector Agr. Export, Inc., (Mallinckrodt), Miami, 305-621-7581
So. Agr. Insecticides, (Mallinckrodt), Palmetto, 813-722-3285
Southern Chemicals, Inc., (Elanco), Sanford
Southern Mill Creek Prod., (Mallinckrodt), Miami
(Elanco, Fisons, Mallinckrodt, Velsicol) Tampa, 813-626-2111
Stephenson Chemical Co., (Velsicol), Jacksonville, 904-355-4901
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Swift Chemical Company, (PBI-Gordon, Velsicol), Winter Haven, 813-293-3147

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Krigger & Company, Inc., (Velsicol), Macedonia, (216) 467-2176
Lakeshore Equipment Company, (Elanco, Creative Sales, PBI/Gordon, Mallinckrodt, Velsicol), Elyria, (216) 323-7544
Lanphear Supply, (Creative Sales), Cleveland, (216) 381-1704
Lee Road Nursery, Inc., (Elanco), Shaker Heights
A.M. Leonard Company, (Creative Sales), Piqua, (513) 773-2694
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Lucas Landmark, Inc., (Mallinckrodt), Berkey, (419) 829-2791
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Mellinger's, Inc., (Creative Sales), North Lima, (216) 549-9861
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Noxious Vegetation Control, Inc., (Elanco), Columbus
Pennwalt (Pennwalt), Columbus, (614) 890-2255
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Southern Mill Creek Products of Ohio, (Fisons), Cleveland, (216) 481-8404
Thorton-Wilson Distributors, (Elanco, PBI/Gordon, Mallinckrodt), Cincinnati, 513) 791-8565
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U. S. Garden Sales, Inc., (PBI/Gordon), Cleveland, (216) 283-1210
U. S. Garden Supply, (Mallinckrodt), Cleveland
Van Atta Seed Company, (Elanco), Cincinnati

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B & G Company, (Creative Sales), Oklahoma City, (405) 848-8858
Paul Blakeney Company, (Elanco, Mallinckrodt, Velsicol), Oklahoma City, (405) 528-7577
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Kem-Weed Control, Inc., (Elanco), Enid
Nick Knott Turf Equipment Company, (Elanco), Tulsa
Muskogee Seed Company, (Elanco), Muskogee
Thompson Hayward (Thompson Hayward), Oklahoma City, (405) 232-7624; Oklahoma City, (405) 685-7741
Thompson Hayward (Thompson Hayward, PBI/Gordon), Tulsa, (918) 446-1555
Tony's Chemical House, (Elanco, PBI/Gordon), McAlester, (918) 423-4345
Wait Mfg. Company, (PBI/Gordon), Tulsa, (918) 584-3334)

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Farmcraft, Inc., (Elanco), Tigard
The Chas. H. Lilly Company, (Elanco, PBI/Gordon), Portland, (503) 256-4600
Mid Coast Chemical, (Best Products), Medford, (503) 779-7851
Oregon Horticultural Supply, (Mallinckrodt), Portland, (503) 232-7138
Reforestation Services, Inc., (Elanco), Salem
H. J. Stoll, (Best Products), Portland, (503) 235-8946
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Asplundh Tree Expert Company, (Elanco), Willow Grove
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Farm & Golf Course Supply Co., Inc., (PBI/Gordon, Mallinckrodt, Velsicol), Philadelphia, (215) 483-5000
Fisher & Sons Company, Inc., (PBI/Gordon, Mallinckrodt, Velsicol), Malvern, (215) 644-3300
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Histand Supply, (PBI/Gordon), Wycombe, (215)598-3102
Krigger & Company, (PBI/Gordon, Velsicol), Pittsburgh, (412)931-2176
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Henry F. Michell Company, (Elanco, Mallinckrodt), King of Prussia, (215) 265-4200
Miller Chemical & Fertilizer Company, (Elanco, PBI/Gordon), Hanover, (717) 632-8921
Penn Line Services Company, (Elanco), Scottdale
Penn State Seed Company, (Elanco), Forty Fort
Pennsylvania Turf Equipment, (Mallinckrodt, Velsicol), Lebanon, (717) 273-2629
Philadelphia Toro, (PBI/Gordon, Mallinckrodt, Velsicol), Doylestown, (215) 345-7200
Pocono Supply Company, (PBI/Gordon), Horsham, (215) 672-9274
(Mallinckrodt), Hatboro
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Superior Chemical Products, Inc., (Elanco, Velsicol), Philadelphia, (215) 289-7500
Weeds, Inc., (Elanco), Yeadon

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Old Fox Chemical, Inc., (Elanco, Mallinckrodt, PBI/Gordon), East Providence

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FIXED SOD COST DECREASES AS MARYLAND FARM SIZE RISES

By J. Thomas Gilbert, Jr. and Billy V. Lessley[1]

This article discusses fixed and variable costs and returns by size of farm for producing unharvested turfgrass in Maryland in 1976.[3] A previous article detailed the importance of the commercial sod industry in Maryland. In 1976, the industry was composed of 63 growers who produced 8,712 acres of turfgrass. Of this acreage, an estimated 2,497 acres were sold for $5.4 million at the farm level.

Total cost estimates derived from conducting interviews with Maryland turfgrass producers were divided into categories of variable and fixed costs. Variable costs refer to all expenses that are a function of output and are incurred only if production is carried on. Fixed costs refer to those expenses incurred for employing fixed resources.

Variable expenditures for the production of turfgrass included seed, fertilizer, top-dress fertilizer, herbicides, lime, fuel and oil, production labor (labor used in field operations) and interest on variable capital (calculated at 8.25 percent) These variable costs of production for the various sizes of turfgrass farms are presented in Table 1.

The largest expenditure for any item of average variable cost for all growers was for top-dress fertilizer. This was followed closely by the expenditure for seed (Table 1). Producers were willing to spend these amounts for seed and fertilizer to promote a good stand of quality turfgrass. Individual costs for seed and top-dressing requirements were 22 and 24 percent, respectively, of total variable cost for the all growers category.

The next most important expense item of average variable cost was for production labor. Expenditures for production labor were based on labor requirements and hourly wages used in performing various typical cultural practices.

Table 2 shows that total labor requirements decreased as farm size increased to 300 acres then increased for farms with more than 300 acres. However, production labor cost economies were offset by an increasing average hourly wage paid as farm size increased. Wage rates ranged from $2.88 per hour on the smallest farms to $3.67 per hour on the largest farms, or a 27 percent increase. This increasing average wage rate caused average production labor expenditures to vary little for all farm sizes except farms with 151-300 acres. Producers in this category reported an average production labor cost of $45.44 per acre while other categories averaged around $60.00 per acre. The large decrease in production labor to 14.22 hours accounted for the lower labor cost for this size group (Table 2). Too, these 14.22 hours required for production labor were 35 percent less than the highest reported figure found on farms with less than 100 acres and 27 percent less than the state average.

Variable input cost requirements (seed, fertilizer, top-dressing fertilizer, herbicides, lime and

Table 1. Average Variable Costs of Production for Various Sizes of Turfgrass Farms, Maryland, 1976

Item	Farm Size: Less Than 100 Acres	100-150 Acres	151-300 Acres	Greater Than 300 Acres	All Growers
	Dollars Per Acre, Two-Year Production Period				
Seed	78.40	60.80	69.00	84.32	76.13
Fertilizer	32.96	33.40	29.12	37.06	33.54
Top-dressing	84.12	79.26	72.52	77.64	80.80
Herbicides	11.07	11.91	15.25	20.85	14.31
Lime	17.59	13.25	19.25	14.83	16.59
Fuel and Oil	32.27	30.36	26.77	31.55	31.11
Production Labor	63.65	60.39	45.44	59.58	59.61
Interest on Variable Capital	28.11	25.47	24.40	28.65	27.43
Average Variable Cost	348.17	314.84	301.75	354.48	339.52

Table 2. Average Labor Requirements for Turfgrass Production for Various Farm Sizes, Maryland, 1976[a]

Cultural Practices	Farm Size: Less Than 100 Acres	100-150 Acres	151-300 Acres	Greater Than 300 Acres	All Growers
	Hours Per Acre, Two-Year Production Period				
Seedbed Preparation	4.13	3.59	3.20	3.10	3.69
Stone Removal	4.03	2.90	2.11	2.11	2.99
Seeding	1.05	.83	.48	.64	.85
Top-dressing	1.09	.74	.60	.94	.95
Spraying	.49	.28	.54	.55	.49
Mowing	13.72	13.69	7.94	10.11	12.11
Total Labor	22.07	20.33	14.22	16.24	19.43

[a] Simple summation by cultural practices will not give the reported total labor requirement for each size of farm. Each estimate of the labor requirement by cultural practice was computed from only those growers in each farm size category who actually performed that practice. Total labor for each size of farm is therefore a weighted summation of the labor requirement by cultural practive.

[1] Scientific Article Number A2491, Contribution Number 5522 of the Maryland Agricultural Experiment Station, Department of Agricultural and Resource Economics. For more detailed information, an Experiment Station publication will be available in late fall or early winter.

[2] Research Assistant and Professor, Department of Agricultural and Resource Economics, University of Maryland.

[3] All costs are based on a two-year production period. This period was reported by the majority of growers as the production-marketing period that one could expect under normal conditions.

[4] George A. Stevens, *Farm Data Manual*, Department of Agricultural and Resource Economics, AREIS No. 18, Cooperative Extension Service, University of Maryland, College Park, Maryland, August, 1977. Repair estimates were based on a percentage of investment for buildings and equipment and were placed in the fixed cost category.

interest on variable capital) ranged from a high of $354.48 per acre on farms with more than 300 acres to a low of $301.75 per acre on farms with 151-300 acres (Table 1). The largest farms were charac-

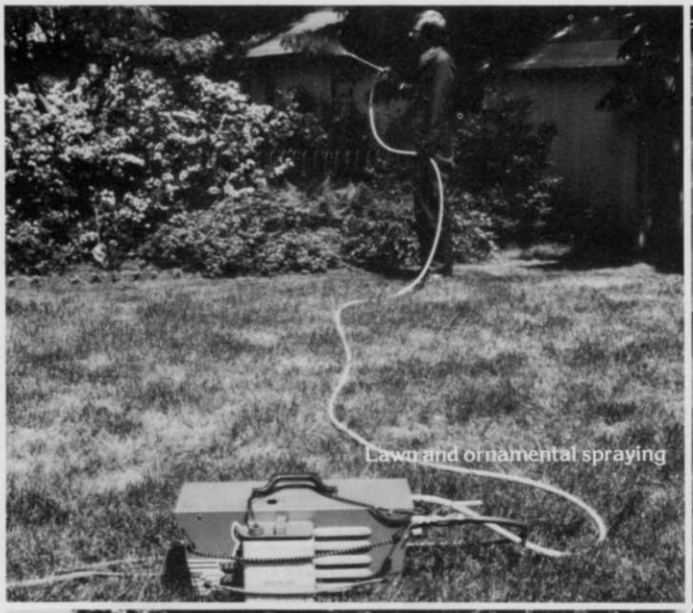
Table 3. Average Fixed Costs of Production for Various Sizes of Turfgrass Farms, Maryland, 1976

Item	Farm Size: Less Than 100 Acres	100-150 Acres	151-300 Acres	Greater Than 300 Acres	All Growers
	— Dollars Per Acre, Two-Year Production Period —				
Fixed Costs					
Machinery and Equipment					
Depreciation	68.12	48.10	37.64	35.55	41.29
Repairs	34.06	24.05	18.82	17.78	20.65
Insurance	4.08	2.89	2.26	2.13	2.48
Permanent Structures					
Depreciation	19.26	14.56	10.78	10.18	14.70
Repairs	3.86	2.92	2.16	2.04	2.94
Insurance	3.86	2.92	2.16	2.04	2.94
Supervisory Services	7.21	6.70	15.14	26.05	13.65
Real Estate Tax	9.00	9.28	9.24	9.38	9.28
Interest on Fixed Capital	52.50	38.26	30.44	29.78	35.52
Land Rental Rate	70.00	70.00	70.00	70.00	70.00
Average Fixed Cost	271.95	219.68	198.64	204.93	213.45

Table 4. Average Total Costs of Production for Various Sizes of Turfgrass Farms, Maryland, 1976

Item	Farm Size: Less Than 100 Acres	100-150 Acres	151-300 Acres	Greater Than 300 Acres	All Growers
	—Dollars Per Acre, Two-Year Production Period—				
Fixed Costs					
Machinery and Equipment					
Depreciation	68.12	48.10	37.64	35.55	41.29
Repairs	34.06	24.05	18.82	17.78	20.65
Insurance	4.08	2.89	2.26	2.13	2.48
Permanent Structures					
Depreciation	19.26	14.56	10.78	10.18	14.70
Repairs	3.86	2.92	2.16	2.04	2.94
Insurance	3.86	2.92	2.16	2.04	2.94
Supervisory Services	7.21	6.70	15.14	26.05	13.65
Real Estate Tax	9.00	9.28	9.24	9.38	9.28
Interest on Fixed Capital	52.50	38.26	30.44	29.78	35.52
Land Rental Rate	70.00	70.00	70.00	70.00	70.00
Average Fixed Cost	271.95	219.68	198.64	204.93	213.45
Variable Costs					
Seed	78.40	60.80	69.00	84.32	76.13
Fertilizer	32.96	33.40	29.12	37.06	33.54
Top-dressing	84.12	79.26	72.52	77.64	80.80
Herbicides	11.07	11.91	15.25	20.85	14.31
Lime	17.59	13.25	19.25	14.83	16.59
Fuel and Oil	32.27	30.36	26.77	31.55	31.11
Production Labor	63.65	60.39	45.44	59.58	59.61
Interest on Variable Capital	28.11	25.47	24.40	28.65	27.43
Average Variable Cost	348.17	314.84	301.75	354.48	339.52
Average Total Cost	620.12	534.52	500.39	559.41	552.97

TANKS FOR THE MEMORY!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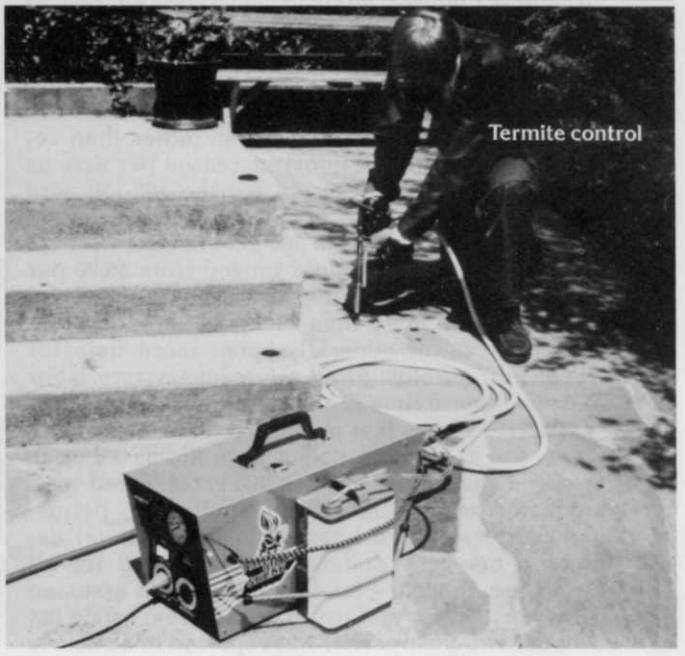
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terized as spending above or near average per acre costs for seed, fertilizer, top-dressing fertilizer and production labor. The use of these inputs at or above average cost was not a function of farm size, rather a function of production management decisions. The more intensive applications of production inputs were an effort to insure adequate growth, appearance and quality of the grass which would ultimately help in the marketing and sale of the product.

Fixed costs incurred in the production of sod over a two-year production period are reported in Table 3. The calculated annual fixed cost for all machinery and equipment was based on an assumed life of the asset of eight years with 20 percent salvage value. The average fixed cost per acre for buildings and permanent structures assumed a 20 year life and zero salvage value. The resulting annual cost for depreciation, repairs and insurance was calculated at 15.6 percent of the value of the machinery and equipment complements and seven percent of the new value for permanent structures.[4] Interest on fixed capital was charged at an annual rate of 8.5 percent of the average value for fixed investments. A land rental rate of $70 per acre ($35.00 per year) was used as the opportunity cost of land for sod production.

The cost of supervisory labor (other than required for field operations) increased per acre as farm size increased, except for the 100-150 acre farm size category which was nearly equal to that reported for the less than 100 acre category (Table 3). Costs for these services ranged from $6.70 per acre for farms with 100-150 acres to $26.05 per acre for farms with more than 300 acres. Producers on the larger farms generally spent more time for travel to the fields, hired more supervisory labor and spent more time finding and negotiating sales.

Table 3 shows that average fixed cost per acre decreased as average size of farm increased up to the farm size of greater than 300 acres. Fixed costs attributed to machinery and equipment, permanent structures and interest on fixed capital decreased per acre as farm size increased for all farm sizes. Since the land rental rate was assumed to be constant for all farm sizes, and real estate tax over the two-year period was reported to be nearly equal for all farm sizes, the increase in the total fixed cost per acre on farms of greater than 300 acres can be traced to increasing supervisory labor costs as farm size increased. Again, the higher supervisory cost is explained by time being spent in supervising a large number of employees and managing the intensive cultural practices, while also spending time in transacting sales for the extra volume of output on the largest turfgrass farms.

To summarize, an examination of the average total cost items shown in Table 4 reveals there are four areas which affected the total cost structure for the various farm sizes:

1. Average fixed cost per acre for machinery, equipment and permanent structures decreased as farm size increased for all farm sizes.

2. Costs of supervisory services increased per acre as farm size increased except for the 100-150 acre farm size category where the cost was nearly equal to that reported for the less than 100 acre size category.

3. Average variable cost decreased through the three smallest farm size groups but increased to its highest level on the largest farms.

4. Hourly wages paid, according to farm size, increased as farm size increased, virtually offsetting any dollar savings from lower per acre labor requirements on the larger farms.

Gross receipts per acre for mixtures of Kentucky bluegrasses and Red Fescue or Kentucky-31 Tall Fescue and Kentucky bluegrass sold on an unharvested basis for an average of $657.09 per acre in 1976 (Table 5). The receipts ranged from a low of $611.36 per acre on farms with less than 100 acres to a high of $734.50 per acre on farms with 100-150 acres.

Table 5. Return to Management from Sale of Turfgrass by the Acre, Maryland, 1976

Item	Farm Size (Net Acres of Turf)				
	Less Than 100 Acres	100-150 Acres	151-300 Acres	Greater Than 300 Acres	All Growers
	$ per acre	$ per acre	$ per acre	$ per acre	$ per acre
Gross Receipts Per Acre	611.36	734.50	685.00	700.00	657.09
Less Variable Cost Per Acre Including Hired or Operator Labor Equals	348.17	314.84	301.75	354.48	339.52
Return to Land, Fixed Capital, and Management	263.19	419.66	383.25	345.52	317.57
Less Fixed Cost Per Acre Including 8.5% on Fixed Capital and $70.0 Land Rental Rate Equals	271.95	219.68	198.64	204.93	213.45
Return to Management	—8.76	199.98	184.61	140.59	104.12

Return to management (gross receipts minus expenses) from the sale of turfgrass sold on a unharvested basis for various farm sizes is also reported in Table 5. Under industry conditions prevailing in 1976, farms with 100-150 acres, selling turfgrass on an unharvested basis, realized the highest return to management of $199.98 per acre over the two-year production period. Farms with less than 100 acres, which incurred the lowest average price per acre and the highest total production costs per acre, realized a negative return to management of -$8.76 per acre for the two-year production period.

The third article in this series concerning the Maryland sod industry will present costs and returns for various vertically integrated production, harvest and transportation options observed for the industry in 1976. **WTT**

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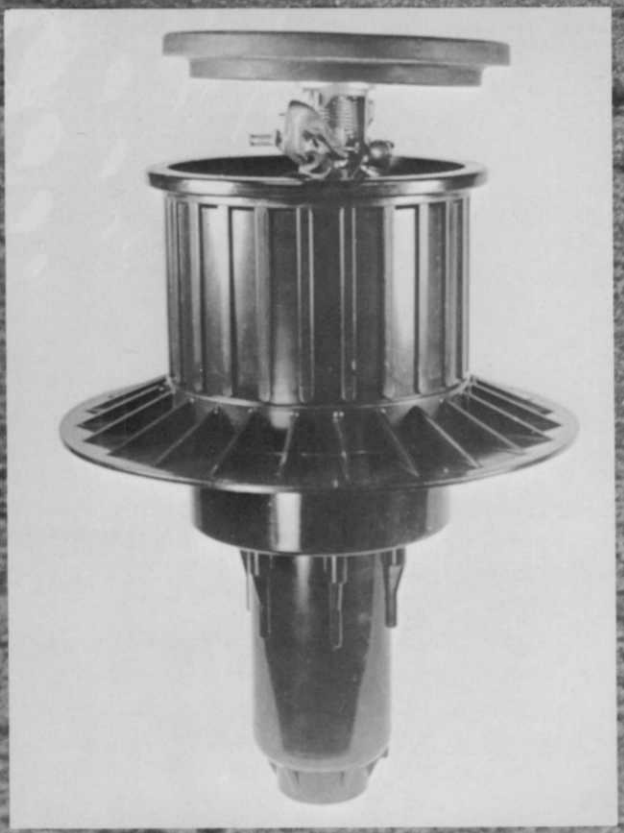

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VEGETATION MANAGEMENT

By Roger Funk, Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: *I have a turf area in an industrial lawn that has a cation exchange capacity of 7.5. What would you recommend as a top dressing to build up the soil, and how often should this material be applied?*

A: As you probably are aware, many people consider the cation exchange capacity (CEC) of a soil the best single index of potential soil fertility. A "good" CEC would be in the range of 14 to 20 milliequivalents per 100 grams of soil. The CEC of your soil (7.5) indicates a fine sandy loam that would have problems retaining both nutrients and water.

Organic matter improves the CEC of sandy soil more rapidly than mineral soil (clay or silt) additives, although a good top soil would be satisfactory. However, the use of a top dressing that is distinctly different from the underlying soil may result in the development of an interface, a layering affect that impedes penetration of air and water. Top dressing in conjunction with a coring process will minimize the layering by providing some integration of the soil and top dressing. The top dressing process may be repeated over a period of several years until the desired CEC has been achieved.

Q: *What is the best application for getting rid of broadleaf weeds when one doesn't want to affect or damage (kill) newly planted trees. We've lost trees with spray applications.*

A: We have had good success with paraquat or Roundup although you may get some injury on young, green-barked trees.

Q: *I have a maple tree with roots that are on the surface and are injured when I mow. Can I cut off these roots safely?*

A: Unless there are a number of large roots, you should be able to prune them without causing injury to the tree. However, the roots are differentiated near the surface because that is where conditions are favorable for root growth and development. Maples are notorious for surface rooting, but compacted soils, waterlogging and other factors which inhibit air penetration contribute to surface root development. Unless these conditions are corrected, new roots may reappear on the soil surface.

Q: *I always used a wetting agent when I applied paraquat, but someone told me not to use one with Roundup. I have been using it anyhow. Who is right?*

A: Whoever told you not to use a spreader sticker with Roundup is right. Always follow the recommended application procedures on the chemical label. The Roundup label states, "DO NOT ADD ADDITIONAL SURFACTANT."

Q: *What is the latest status on tree wound dressings? Should we still be using them?*

A: Although there has been some fairly recent research indicating that tree wound dressings do not prevent the entry of decay organisms, other evidence has shown that certain beetles are attracted to fresh wounds on trees if they are not painted. One Minnesota tree company was sued for not painting cuts on oaks which subsequently died from oak wilt, a disease carried by sap feeding beetles. Of course, the best policy would be to avoid pruning whenever possible during periods of beetle flight.

New research is being performed and projected by the Davey Company and by others in the field of arboriculture. Until more conclusive evidence is available which suggests that pruning cuts should not be treated, our recommendation will remain to paint all pruning cuts over one inch in diameter. **WTT**

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PROSCAPE

By Michael Hurdzan, Ph.D., golf course designer and consultant

Q: *We have had little success removing Poa annua from our bent greens. Is there any new chemical I can use this fall to eliminate or at least slow down the annual bluegrass?*

A: Although researchers at many universities and chemical companies are working on this problem, there have been no recent major advances in selectively controlling *Poa annua* in bentgrass. The physiology of the annual bluegrass is so close to that of desired turfgrasses it is difficult to develop a selective control mechanism.

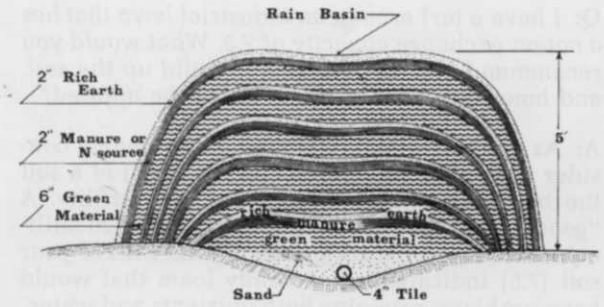
Annual bluegrass germinates during cool, moist times of the year (spring and predominately fall). It produces seedheads in late spring and early summer. Preemergence materials must be applied in both spring and fall during active germination. Post-emergence materials are applied after germination when the plant is most susceptible to the specific chemical. Although some superintendents have had remarkable success with post-emergence materials on bentgrasses, pre-emergence materials appear safer to use on bentgrass.

Bensulide (Betasan®) is a preemergent herbicide manufactured by Stauffer Chemical Co., which kills germinating *Poa annua* seeds. To be effective, the chemical must be in the root zone during germination. Disruptions of the root zone after application reduce the effectiveness of bensulide. Maintenance procedures such as thatching, vertical mowing, aerification or heavy topdressing should be done two to three weeks prior to application. In addition, overseeded or sodded turf should not be treated for a period of at least three mowings after installation or seeding.

The residual period of bensulide is about 4-6 months on sand-base greens and 8-12 months on soil depending upon soil type, soil texture, pH, and rainfall or irrigation frequency. This means that no reseeding should be done within four months of application. However, bensulide can be deactivated by applying seven pounds of activated charcoal per 1000 sq. ft. and washed into the soil by irrigation. Then reseeding can be done after only seven days.

Although our arsenal against *Poa annua* in bentgrass is limited, bensulide has a good safety factor, can be quickly deactivated with charcoal, and is readily available. It must be integrated into the overall maintenance and renovation program, but when properly done over a three year period, it has given good results.

Right now is the time to apply the fall application of any pre-emergence material. If you are uncertain of its performance, at least establish a test area for yourself on half of a green, tee, or well maintained nursery area. This field observation is valuable not only to yourself and other superintendents but to the chemical companies as well.



Q: *Can you recommend a good method of compost pile construction?*

A; The standard compost pile is made by first laying down a 5-6" layer of green material, a 2" layer of manure, (blood or bone meal, sewage sludge, or other high protein material), a 2" layer of rich earth, ground limestone and rock phosphate. This process of layering is continued until the pile is about five feet high and five feet wide. The length of the pile is optional. This gives the best aeration to the compost pile.

After this material has been piled up and the surface lightly tamped to prevent blowing, form a shallow basin on top of the pile to catch rain water. Lastly cover the pile with a thin layer of topsoil. All that remains is to thoroughly wet the pile and let it decay, turning the pile every 4-5 weeks.

From this basic method many variations have been developed such as pits, using fencing to hold the compost pile, or bricks, and using different materials. As long as the pile is turned every 3-4 weeks as the temperature inside the pile reaches 150° F.

Compost piles provide a perfect way to get rid of leaves and grass clippings and return a profit from the sale of the compost. To make a leaf compost requires a good size pile of leaves that have been shredded by either being put thru a shredder or mulched with a rotary mower with a mulching attachment. Since leaves are low in N they must be supplemented with a fertilizer for optimum composting. A good formula is a 1:1:1:.2

100# of leaves
100# of grass clippings or old hay
100# of manure (2-3# N)
20# of ground rock minerals (P,K, Ca)

Mix all these shredded materials together and wet the pile thoroughly. By the second day the pile should start to heat any by the third day it should be turned. Then turn the pile for the next 12-15 days on a three day cycle until the pile starts to cool. Place the material thru a shredder and it is ready to use.

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The Land Reclamation Report

The newsletter of mine site restoration and revegetation of other disturbed lands.

September 4, 1978/VOL. 1, NO. 3

The Land Reclamation Report

The newsletter of mine site restoration and revegetation of other disturbed lands.

LAWSUITS

Almost all interim regs upheld; possible changes up to OSM

Industry had few reasons to celebrate over the holiday weekend since it was still suffering from the impacts of U.S. District Judge Thomas Flannery's August 24 decision that struck down most of its lawsuits challenging the OSM's interim regulations. The few bright spots in the lawsuit pertained to reclamation, but even some of those decisions were sent back to the Secretary of the Interior and OSM for further comment, with no promise of revision.

The only area where Judge Flannery has told OSM that the regulations must be changed pertains to prime agricultural farmlands.

Flannery struck down the clause in the farmlands regulation saying that any land used during five of the last 20 years would be placed in the prime farmlands category. Saying the regulations was "clearly overbroad in achieving its stated purpose" he has asked OSM to come up with a new definition.

There were some partial victories. Judge Flannery has required OSM to reconsider its rule on sedimentation ponds and dams that imposes a three-foot difference between the top of the dam and the surface of the water. But OSM was only asked to reconsider this since Flannery felt it did not document its reasons for the requirement in previous court briefs. He seemed to feel that the government should more or less double-check this since "these dam requirements are absolute and there is no variance procedure."

OSM will be given 60 days to reconsider some provisions that regulate the use of valley and head-of-hollow fill for spoil disposal. The judge asked the government agency to look again at this requirement only after West Virginia cited a March 1978 interim study by Skelly & Loy, the Harrisburg, Pa. engineering firm, which has determined much less costly methods in its report titled "Environmental Assessment of Surface Mining Methods. Head-of-Hollow Fill and Mountaintop Removal."

The judge also cited the study when asking OSM to review its regulations governing design criteria for underdrains and compaction of spoils in valley fills in lifts that are less than four feet thick. He also said OSM should "take into account" that West Virginia is considering variances in the latter requirement.

The final partial victory was won on the 100-foot buffer zone requirement around intermittent and perennial streams, an area considered "critical" by the Mining and Reclamation Council of America's Dan Gerkin. Here, too, the judge only asked OSM to reconsider since the reasons for its regulations were not stated in its court brief. Flannery said he would not enjoin its enforcement since it is reasonable, supported by state authorities and technical literature, and contains a variance procedure.

MONTANA LAND DISTURBED BY SURFACE MINING

MONTANA ACREAGE BONDED UNDER STATE MINE PERMITS

Industry was walloped in other areas. The court struck down Peabody Coal Company's challenge that lands improperly disturbed prior to mining must be restored to the premining use of surrounding lands after surface mining occurs. Flannery also said the regulations do not interfere with EPA's control over water pollution, meaning OSM can set up provisions for variance and exemptions on sedimentation pond design and waste treatment management.

Road gradient requirements and sections making companies cover toxic soil with four feet nontoxic material or provide treatment to prevent water pollution were upheld.

Finally, the court upheld the limited use of terraces and the design criteria, and the right of OSM to approve the terraces.

STATE GOVERNMENT

Illinois may set no time limit on farm productivity

No official word has yet been issued in Illinois on prime farmland regulations, but the state's Department of Agriculture says it will allow coal companies as much time as they need to grow crops that produce 90 percent or more of the yields than before mining occurred.

This word comes from Michael Williams, a reclamation supervisor in the Agriculture Department. He said the state doesn't fear poor cooperation since they will be holding some of the companies assets.

"As long as we have their bond, we're not that concerned," Williams said. "If they

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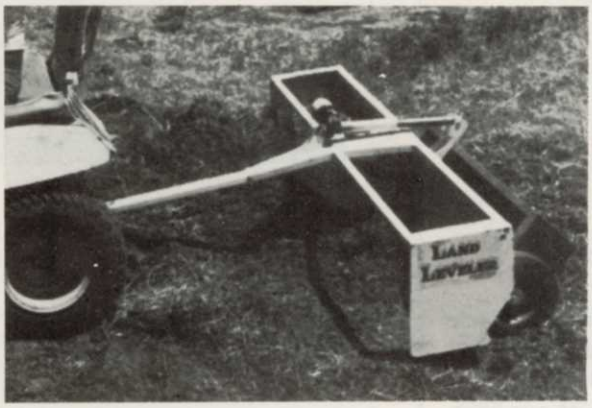

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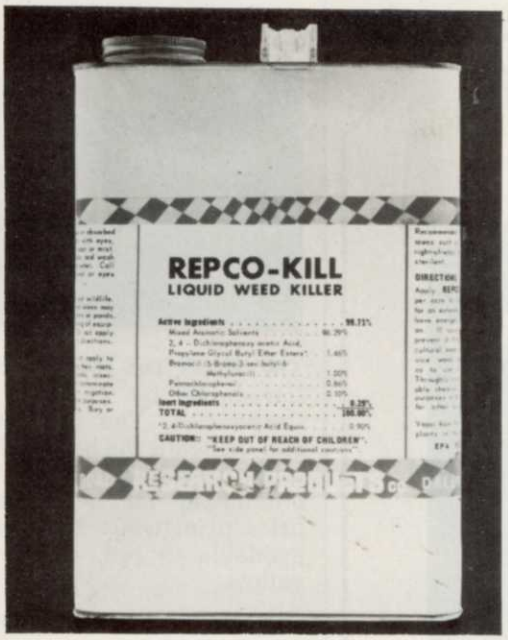

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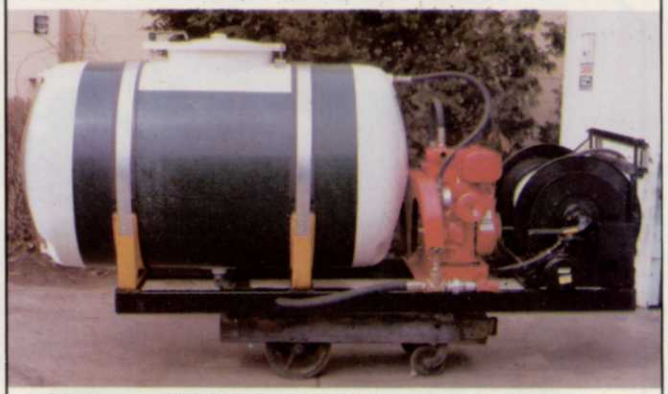

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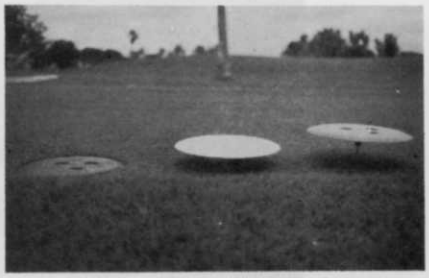
The DH5 Quad, offered by the Davis Division of J I Case, is a 55-horsepower class combination unit with trenching, backhoeing, backfilling and direct-burial line-laying capability. Standard features include 4-wheel hydrostatic drive, four-way hydraulic articulation, Davis single-lever Mono-Stick control, limited-slip differentials, one-half inch unitized steel frame, and a 20-gallon fuel tank.

The liquid-cooled Case 188 4-cylinder diesel engine develops 55 hp at 2200 rpm and is also available in 57-hp gasoline fuel version. A special design provides two separate hydraulic systems, one for ground drive and one for attachments. The unit weighs approximately 9500 pounds with operator aboard.

Circle 705 on free information card



TM* Flush Tee Markers have been introduced by Turfgrass Products Corporation. The markers are flat and lie below the height of the grass, allowing mowers to pass over and eliminating the need for removal prior to mowing. The markers are available in red, white, blue and yellow.

Circle 706 on free information card

Krenite brush control agent from Du Pont is now registered for use on multiflora rose at rates of two to three gallons per acre. Thimbleberry and vine maple were also added at rates of one and one-half to three gallons per acre.

Krenite is highly selective, according to product specialist Bengt Godring, and when applied on susceptible brush species, it has little, if

any, effect on vegetation growing alongside or beneath the brush. It is safe to use on fence rows adjacent to farm crops, around farm ponds, drainage systems, and water reservoirs. Krenite is now registered for control or suppression of more than 40 brush species.

Circle 707 on free information card

The Diesel Hydro Traveler, featuring a 14-horsepower electric start Deutz diesel engine, has been added to the Hydro Traveler Irrigator line manufactured by Hydro Engineering.

Fuel and hydraulic oil tanks on the diesel-powered model are larger and have been relocated, according to a company spokesman. Other improvements include relocated controls for greater operator efficiency and convenience, and a newly designed fiberglass hood over the cable reel and engine.

The hydraulic-drive Hydro Travelers are capable of irrigating 20 acres a day with only two man-hours of labor. Other features include a tricycle design that allows easy maneuverability and twin riser construction for more uniform water distribution.

Circle 708 on free information card

The Sidewinder SX-42 rotary cutter is being introduced by FMC Corporation for use on tractors as low as 12 HP. The economy priced SX-42 is equipped with a three-point hitch for quick and easy hook-up. A safety shield on the PTO drive line is standard.

Circle 709 on free information card

It runs through the briars, it runs through the brambles and it runs through the timber where a rabbit couldn't go.

If the British had used a Klearway at the Battle of New Orleans, they could have beaten a hasty retreat and returned to face "Old Hickory" another day.

Foot soldiers couldn't make it in the Louisiana swamps, and improperly designed equipment can't make it when you need to clear tough right-of-way.

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For complete details, write Kershaw Manufacturing Co., 2205 West Fairview Avenue, Montgomery, Alabama 36108.

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The army of one.

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CLASSIFIEDS

When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, Dorothy Lowe, Box 6951, Cleveland, Ohio 44101.

Rates: All classifications 65¢ per word. Box number, $1. All classified ads must be received by Publisher the 5th of the month preceding publication date and be accompanied by cash or money order covering full payment. Mail ad copy to: Dorothy Lowe, Weeds, Trees & Turf, P.O. Box 6951, Cleveland, Ohio 44101.

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SPRAYERS 50-60 gallon/minute pump, 1,000 gallon tank. Call collect 201 891-0309.

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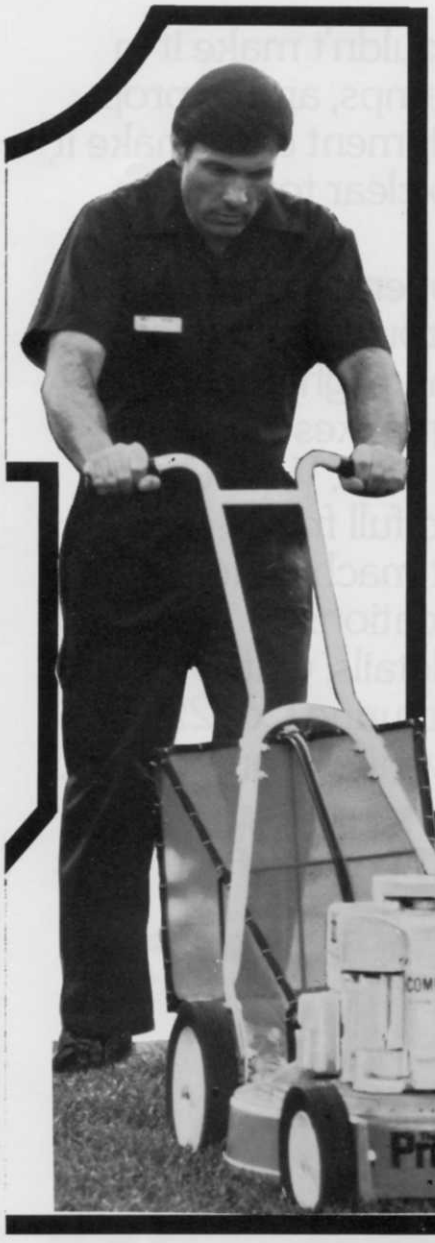

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NEW — PERENNIAL GRAIN — NEW. It's here — at last! Ranchers, farmers, sportsmen, etc. use for hay crops, farm animals, wildlife, mine reclamation, erosion control. Also Cicer Milkvetch, Birdsfoot Trefoil, Crownvetch for same use. Send $1 for informative booklet. Phone 414 685-2929. Kester's Wild Game Food Nurseries, Inc., P.O. Box V-t, Omro, Wisconsin 54963.

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WANT TO BUY OR SELL a golf course? Exclusively golf course transactions and appraisals. McKay Golf & Country Club Properties, 15553 N. East St., Lansing, Michigan 48906. Phone 517 484-7726.

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PRINCETON 1977 self propelled sod harvester. Like new. Reason for selling; purchase of Princeton automatic. Todd Valley Farms, Mead, Nebraska. 402 624-6385.

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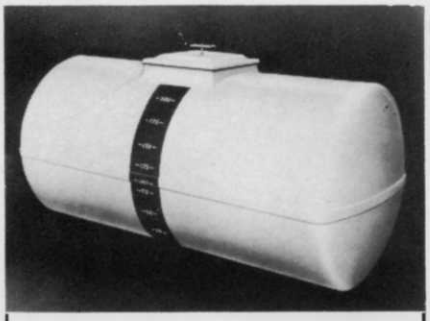
1970 HI-RANGER on F-600 Ford, chipbox, side tool boxes. $21,500.00. Hydro-ax-model 500, $40,000.00, Osborne Tree Service, Mentor, Ohio 44060. 216 951-4355.



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1976 CHEVY C-50 lawn spray truck, excellent condition, 1200 gallon steel tank mounted on 14 foot platform. 2 Hanney electric hose reels with 500 feet of hose on each. Bean 20-20 pump mechanical and jet agitation. $11,500. Call or write: Rusin Landscaping, Inc., 340 North Drive, Lorain, Ohio 44053. Phone 216 233-8217.

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FOR SALE: 1972 Royer shredder, model 362. Phone 203 889-2372.

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BRANCH MANAGER — National automated lawn service presently in franchise market seeks experienced individual to start and head up company areas. Tremendous growth potential for one presently with liquid spray management experience. Send confidential resume to Lawn Doctor, Inc., P.O. Box 525, 142 Highway 34, Matawan, New Jersey 07747.

SUPERINTENDENT OF GROUNDS. Four year Midwest College is seeking a person able to plan and direct the work of tree, shrubbery and turf care; walk and athletic field maintenance; snow removal and assist in budget preparation and execution. Successful candidate should have AA degree in a related field and experience in a supervisory capacity. Starting salary $12,000 with liberal fringe benefits. An equal opportunity/affirmitive action employer. Send resume to Box 201, Weeds, Trees and Turf, Box 6951, Cleveland, Ohio 44101.

ASSISTANT MANAGER/SALESMAN — Immediate opening, progressive tree maintenance company in Central Connecticut. Related sales experience and/or college training desirable. Must be able to pass arborist licensing exam. Some supervisory and managerial functions. Salary, mileage or vehicle supplied, profitsharing, and buying-in opportunity. Send resume and requirements to Bill O'Brien owner: M. Paul Tree Experts, 668 Sullivan Avenue, P.O. Box 684, South Windsor, Connecticut 06074.

ASSISTANT FOREMAN of Sod Production and Maintenance needed for large sod farm in the midwest. Required skills include farming experience, horticultural or agronomy background, mechanical ability. Please send resume to Box 203, Weeds, Trees & Turf, Box 6951, Cleveland, Ohio 44101.

TREE TRIMMING FOREMAN or Superintendent why fight the summer heat and winter cold? Come to temperate California. A progressive tree company in the Santa Clara Valley is expanding and looking for 3 good men. Send resume plus current wages to: Lee's Tree Surgeons, Inc., 18531 Vessing Road, Saratoga, California 95070.

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AERIAL BASKETS, digger-derricks, stump cutter, brush chipper and Prentice loader. 414 354-8730. Allied Enterprises, 9102 N. 75th St., Milwaukee, Wisc. 53223.

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EVENTS

International Garden Trade Fair, Cologne trade fair centre, Cologne, West Germany, **Oct. 1-3.** Contact: Messe- und Ausstellungs-Ges.m.b.H Koln, Postfach 21 07 60, D-5000 Koln 21, phone: (0221)8211.

California Association of Nurserymen's 68th Annual Convention, Ahwahnee Hotel, Yosemite National Park, Calif., **Oct. 3-5.** Contact: C.A.N. office, 1005 8th Street, Suited 302, Sacramento, Calif., 95814, phone: 916/448-2881.

Golf Course Superintendents Association of New Jersey 14th Annual Turfgrass Equipment, Irrigation, and Supplies Field Day, Rutgers Stadium and Golf Course, Piscataway, NJ, **Oct. 3.** Contact: Dr. Henry W. Indyk, Soils and Crops Dept., P.O. Box 231, Cook College, Rutgers University, New Brunswick, NJ 08903, phone: 201/932-9453.

Central Plains Turfgrass Conference, Kansas State University, Manhattan, Kan., **Oct. 4-6.** Call: 913/532-6170.

Northern California Turfgrass Council Irrigation Seminar, Goodman Hall, Jack London Square, Oakland, Calif., **Oct. 4.** Contact: Richard Harrison, Room 201, City Hall, Alameda, Calif. 94501.

Professional Grounds Management Society's 65th Annual Conference and Trade Show, Atkinson Hotel, Indianapolis, Ind., **Oct. 8-12.** Contact: Allan Shulder, Professional Grounds Management Society, 19 Hawthorne Ave., Pikesville, Md., 21208.

Florida Turf-Grass Annual Management Conference and Show, Sheraton Towers Hotel, Orlando, Fla., **Oct. 15-18.** Contact: Florida Turf-Grass Association, 1520 Edgewater Drive, Suite E., Orlando, Fla., 32804, phone: 305/425-1581.

The Irrigation Association Short Course Program, Wastewater Irrigation, Kansas City, Mo., **Oct. 17-19.** Call: 301/871-1200.

National Golf Foundation Fall Luncheon Meeting, The Registry Resort, Scottsdale, AZ, **Oct. 17.** Contact: NGF, 200 Castlewood Drive, North Palm Beach, FL 33409, 305/844-2500.

18th Annual Southern California Turf/Landscape Equipment & Materials Educational Exposition, Orange County Fairgrounds, Costa Mesa, Cal., **Oct. 18-19.**Call: 213/798-1715.

Southwest Turfgrass Conference, Texas Research Center at El Paso, Texas A&M University, El Paso, Tex., **Oct. 19-20.** Dr. Garald Horst, Texas A&M University, Research Center at El Paso, 1380 A&M Circle, El Paso, Tex., 79927.

Western Garden Writers Symposium and Trade Show, Mansion Inn, Sacramento, Calif., **Oct. 21-23.** Call: 916/448-2881.

13th Annual Wisconsin Golf Turf Symposium, Pfister Hotel, Milwaukee, WI, **Oct. 25-26.** Contact: Bob Welch, 8500 S. 5th Avenue, Oak Creek, WI 53154. 414/764-2300.

Florida Nursery and Allied Trades Show, Curtis Hixon Convention Center, Tampa, Fla., **Oct. 27-29.** Contact: FNATS, Inc., 6535 E. Hillsborough Avenue, Tampa, Fla., 33600, phone: 813/626-4149.

Landscape Industry Cost Accounting Seminar, Empire Room, Newporter Inn, Newport Beach, Calif., **Oct. 28.** Call: 213/941-4900.

National Institute on Park and Grounds Management Eighth Educational Conference, Denver, Colo., **Oct. 29-Nov. 2.** Contact: Erik Madisen, Jr., executive secretary, NIPGM, Executive Offices, National Institute, Box 1936, Appleton, Wisc., 54911, phone: 414/733-2301.

ALCA Design/Build Symposium, Dallas, Tex., **Nov. 8-9.** Call: 703/893-5440.

Eighteenth Annual Missouri Lawn and Turf Conference, Hilton Inn, Columbia, Mo., **Nov. 8-10.** 314/882-7838.

Colorado Annual Pesticide Applicator Workshop, Hilton Inn Airport, Denver, Colo., **Nov. 14-15.** 303/839-2838.

The Irrigation Association Short Course Program, Agricultural Irrigation, Salt Lake City, Utah, **Nov. 14-16.** Call: 301/871-1200.

32nd Annual New York State Turfgrass Conference and Trade Show, The Turf Inn, Albany, N.Y., **Nov. 14-16.** Call: 716/434-5338.

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Beer cans, cigarette butts, twigs, bottles, matted grass clippings and rocks look pretty ugly on a beautiful turf.

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Then along came Jacobsen's unique rubber finger pick-up system. You'll find it used on all six of our Sweeper models. They pick up just about everything that you'd call debris, including branches up to 3" in diameter.

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Even wet leaves in wet turf.

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Then, our smaller 154 Riding Sweeper and 154T Towed Sweeper both sweep a 48" swath, and dump manually.

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To find out about the most complete line of Turf Sweepers being made by anyone, ask your Jacobsen distributor for details. What he has to say is bad for debris.

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"I'm convinced the less nitrogen you use, the less disease you'll have. Baron performs very well with less fertilizer than other bluegrasses. Plus Baron has a natural disease resistance all its own. My customers love trouble-free lawns.

"I service a heck of a lot of lawns each year and I get a fantastic renewal rate. I must be doing something right. Dealing with Lofts has surely been a help. They're reliable. When they say they'll deliver. . .they deliver. Today, that's almost miraculous. I know Baron and Lofts will continue to be a major part of my program for a long time to come."

LOFTS

Lofts Pedigreed Seed, Inc.

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Arlington, Mass. 02174
617-648-7550

Great Western Seed Co.
Albany, Ore. 97321
503-926-2636

Lofts Kellogg Seed Co.
Milwaukee, Wis. 53201
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Lofts/New York
Cambridge, N.Y. 12816
518-677-8808

Lofts/Maryland
Landover, Md. 20785
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